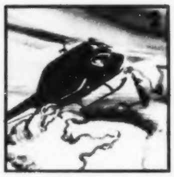
UNITED STATES ARMY SEPTEMBER 1972

AVIATION DIGEST

UNITED STATES ARMY AVIATION DIGEST

SEPTEMBER 1972 VOLUME 18 NUMBER 9



Views From Readers 1
Mission: Nightmare 2
Turbine Trainers 5
Synthetic Flight Training System 6
Charlie and Danny's Write-In 12
The Power Of Positive Prevention 13
The Extra Step 14
Can These Two Puzzle Parts Solve Your Transponder Problem? 18
For Tac Tickets Only 22
Instrument Corner 25
Rationale 26
Aviation In The French Army 28
What Is A Learning Center? 33
Checklist Sense 36
The Fine Line 50
The Turbine's 10 Commandments 52
Mr. Aviation 53
ISIS Makes Your Flying Safer 54
Pearl's 56
To Move A Mountain 58
Aviation Accident Prevention Forum 60
Broken Wing Awards 62
USAASO Sez 64
Weather Tidbits Inside Back

DIRECTOR OF ARMY AVIATION, ACSFOR DEPARTMENT OF THE ARMY
BG William J. Maddox Jr.

COMMANDANT, U. S. ARMY AVIATION SCHOOL
MG Allen M. Burdett Jr.

ASST COMDT, U. S. ARMY AVIATION SCHOOL
COL Earl W. Fletcher

EDITOR, U. S. ARMY AVIATION DIGEST
Richard K. Tierney

ABOUT THE COVER

The U. S. Army's first computerized synthetic flight training system is now in operation at the U. S. Army Aviation School located at Ft. Rucker, AL. See the SFTS story beginning on page 6.

Cover photograph by CPT Tom Greene

The mission of the U. S. ARMY AVIATION DIGEST is to provide information of an operational or functional nature concerning safety and aircraft accident prevention, training, maintenance, operations, research and development, aviation medicine, and other related data.

The DIGEST is an official Department of the Army periodical published monthly under the supervision of the Commandant, U. S. Army Aviation School. Views expressed herein are not necessarily those of Department of the Army or the U. S. Army Aviation School. Photos are U. S. Army unless otherwise specified. Material may be reprinted provided credit is given to the DIGEST and to the author, unless otherwise indicated.

Articles, photos, and items of interest on Army aviation are invited. Direct communication is authorized to: Editor, U. S. Army Aviation Digest, Fort Rucker, Ala. 36360.

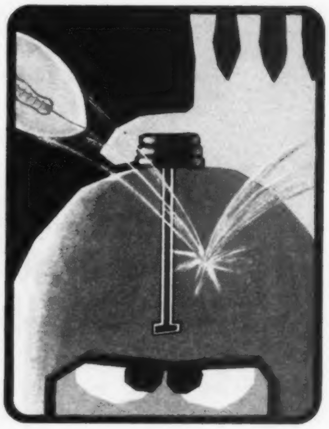
Use of funds for printing this publication has been approved by Headquarters, Department of the Army, 1 October 1970.

Active Army units receive distribution under the pinpoint distribution system as outlined in AR 310-1. Complete DA Form 12-4 and send directly to CO, AG Publications Center, 2800 Eastern Boulevard, Baltimore, Md. 21220. For any change in distribution requirements, initiate a revised DA Form 12-4.

National Guard and Army Reserve units under pinpoint distribution also should submit DA Form 12-4. Other National Guard units should submit requests through their state adjutants general.

For those not eligible for official distribution or who desire personal copies of the DIGEST, paid subscriptions, $4.50 domestic and $5.50 overseas, are available from the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402.

VIEWS FROM READERS



Sir:

The U. S. Army Transportation School at Ft. Eustis, VA, has made available the Aircraft Maintenance Officer Correspondence Course, which will parallel the resident Aircraft Maintenance Officer Course.

To consist of approximately 280 credit hours, the course is designed for officers and warrant officers assigned or anticipating assignment to aircraft maintenance duties. The first 18 subcourses, of 125 credit hours, are now ready for issue.

Titles and scopes of subcourses in the course, as well as enrollment information, can be found in the Transportation School's 1972-73 correspondence course catalog. Other courses and subcourses covering all modes of transportation are also described. A copy may be obtained by writing the Commandant, U. S. Army Transportation School, ATTN: ATSTC-NE, Ft. Eustis, VA 23604.

Information Officer
Ft. Eustis, VA 23604

Sir:

The June 1972 edition of the DIGEST contained a letter in the "Views From Readers" section concerning a list of U. S. Army Aero Clubs.

The Fort Carson Flying Club publishes a directory of all military-affiliated Flying Clubs in CONUS. The 1973 edition will be published in November 1972, and will include Flying/Aero Clubs in Europe and the Pacific.

The *Flying Club Directory* is more than just a list of clubs—it provides such information as field elevations, fuel/POL available, maintenance facilities available, hangar/tie-down space available, etc.

The directory is available through the Fort Carson Flying Club (Fort Carson, CO 80913) for a nominal fee.

Any club not listed in the directory is invited to send us a note requesting an information sheet so they may be included in the 1973 edition. Clubs in Europe and the East are especially requested to let us know they exist.

CPT Louis E. Fausak
Fort Carson Flying Club
Fort Carson, CO 80913

Sir:

Reference the excellent article "Radar's Role in Air Traffic Control" in your May issue, I would like clarification on one statement. On page 31, the pilot states, "Radar primarily serves as an aid to navigation," and the controller agrees. I do not believe that Mr. Beatty intended to leave this impression with the reader. Air traffic control radar has as its primary function the assistance to the controller necessary to perform his separation and sequencing tasks. Navigation information (or radar vectors) are supplied to the aircraft by the controller in order to separate radar identified aircraft, move the aircraft through the controller's sector as quickly as possible, or sequence aircraft in order to achieve both separation and expeditious movement. The majority of radar vectors are supplied in terminal areas, and rarely applied in the enroute structure.

It is both impracticable and impossible for the pilot to expect to rely on radar as a primary navigation system for point to point flights when other navigational methods are available, even though satisfactory radar coverage exists.

LTC Thomas P. Berry
Chief, Avionics Branch
Ft. Rucker, AL 36360

• You're right. Radar does primarily assist the controller to separate and sequence aircraft. In doing this, radar via the controller, serves as an aid to navigation, though it is not, we agree, a primary navaid such as TACAN, VOR, VORTAC, etc.

Radar vectors are frequently supplied in the enroute structure for obtaining operational advantage for the pilot or when requested by the pilot. Also, on request of the pilot and to the extent possible, the controller will provide pertinent information on radar-observed weather and suggest radar navigational assistance to avoid the area . . . then the pilot will be vectored to the nonradar route or to a point or fix to resume his own navigation.

Although other navigational methods are available, it is both practicable and possible for the pilot to *expect* to rely on radar as a primary navigation system . . . loss of all airborne navigation equipment may occur including radio communications—but hopefully your receiver still is operating. Either way, the recommended left (total outage) or right (receiver only) triangular patterns flown may get you down thanks to "seeing" the pattern with satisfactory radar coverage.

MISSION: NIGHTMARE

...though it was clear enroute, the top of the mountain (our intended landing zone) was obscured by clouds that went right to the surface. As we passed the tower the medic yelled that we were moving backwards and about to hit the tower... leaves and sand blew in through the cargo doors and we were in total darkness. I saw the instruments indicating something unbelievable

Captain Steven D. Vermillion

THE STORY THAT you are about to read is completely true, although you may think it is quite unbelievable. Some people say that we should have never attempted the mission, but under the circumstances we couldn't refuse. Our primary mission was to rescue injured people and we felt that we couldn't turn this one down without making an attempt. Read this story, put yourself in the cockpit and make your own decision.

We were asleep on this eventful night when the radio-telephone operator (RTO) called and told us we had an urgent mission. We hurried down to the alert shack and discovered we had two U. S. troops that had received one or more traumatic amputations due to a mortar round going off in the tube. Their need for evacuation was urgent.

As we proceeded east out of Long Binh we plotted the landing zone (LZ) as being on top of Giah Rey Mountain. While flying our UH-1 a few miles west of the mountains we could see that a cloud layer was forming around its top. Elsewhere it was perfectly clear with unlimited visibility. As we began a climb to 4,000 feet I ensured that all of my instruments were still functioning properly.

As we arrived onstation our previous sighting was confirmed. The top of the mountain was not visible due to the cloud layer. A few minutes earlier we had made contact with the ground unit. They advised us that they had two critically injured people who needed immediate evacuation.

After surveying our situation we notified the ground unit that we couldn't land at their location because of the cloud layer. At this time the ground unit's RTO became slightly incoherent. All he could say was for us to come in and land and pick up the wounded. Also on this same push was a doctor from Xuan Loc who kept telling us that if we didn't make the pickup the men were sure to die.

We were able to get the ground commander on the radio and talk the situation over with him. His solution was to have us hover generally over his location and he would talk us down through the clouds using the sound of our aircraft for reference. The other pilot and I looked at each other for a minute and decided that this type of maneuver would be kind of "dumb" to attempt. The first thing that we wanted to try was to hover up the side of the mountain and hopefully go under the cloud layer. This attempt proved to be fruitless because the clouds went right to the surface of the mountain.

We climbed back VFR on top and asked the ground unit if they had any illumination which could be used to light the pad. They said that they had a limited amount of "spooky" flares. Three of the flares were put into a triangular shape and ignited. These were easily seen from our location, so we told the ground commander that we would attempt the approach.

We decided to hold about 50 knots. There was a high radio tower that we had to avoid thus making it a steep approach. As we started down through the clouds the left seat pilot was making a visual approach using the flares as a reference point and I was on the instruments. Approximately halfway down the flares started to go out, so we made a go-around. From this approach we determined that the cloud layer was approximately 300 feet thick.

Because of our low fuel state we decided to go to Blackhorse and refuel. Enroute we requested that our hoist ship be dispatched to the scene. After refueling we returned to our station and found that our hoist-equipped ship had arrived. The hoist ship pilot couldn't complete the mission because he didn't have a constant hovering reference point. This attempt in vain, the hoist ship left and it was up to us again.

We decided to make another approach. This approach had to get us in or we wouldn't have another chance because these were the last three flares that were available. On our previous approach the flares went out about halfway down, so on this approach we decided we could hold a slower air speed combined with a faster rate of descent in hope that we could reach the ground before the flares went out.

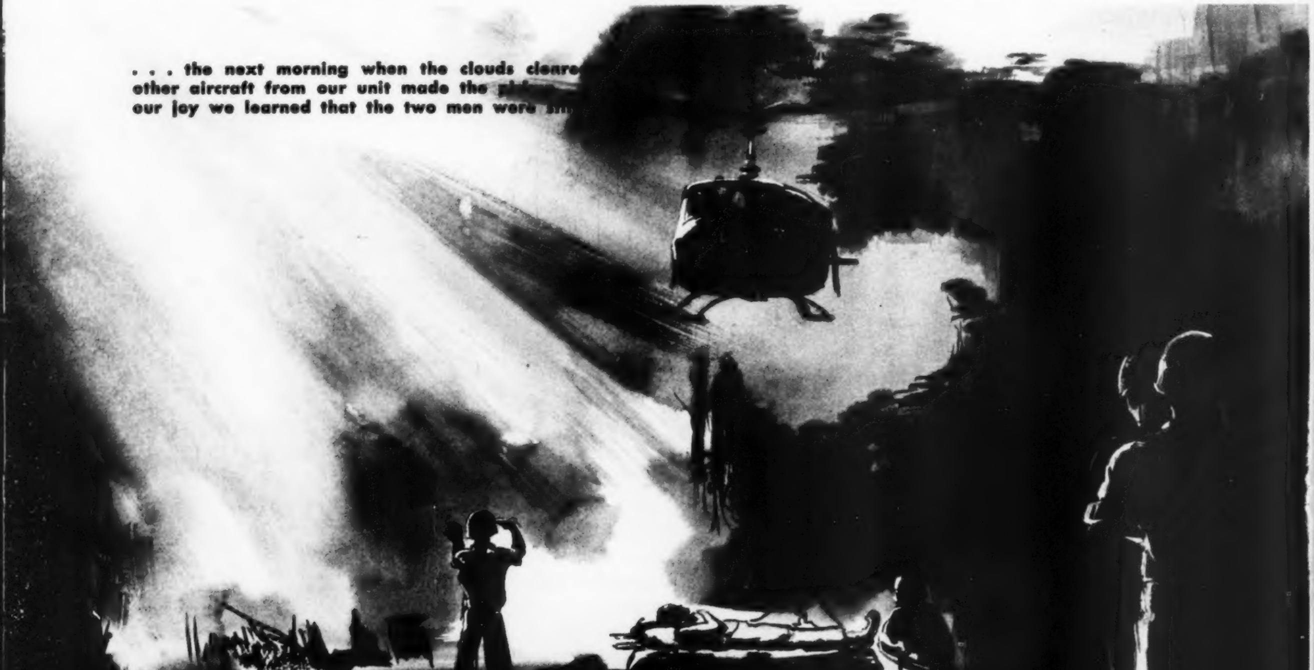
As we entered the clouds everything was going smoothly. As before the left seat pilot was making a visual approach and I was on the instruments. When we passed the radio tower on the right we were only about 100 feet from our touchdown point. The medic yelled out that we were starting to move backwards and were going to hit the tower. Our air speed indicator "said" 35 knots. The pilot lowered the nose and pulled in the power. The next thing we saw was total darkness; the flares had gone out. At this point we were only an estimated 50 feet from the ground and out of control.

As the pilot was attempting to gain control of the aircraft I saw the instruments indicating something unbelievable. The radio magnetic indicator (RMI) had gone around at least three times, the air speed indicator was pegged on zero, and the rpm audio was blaring in our headsets: 5600 rpm. Along with the attitude indicator alternating plus and minus 20 degrees in relation to the horizon, our altimeter "said" that we were 100 feet below the mountain's elevation. The crewchief and medic were screaming that there were sand and leaves coming through the open cargo doors . . . then we were flying in the clear sky. We quickly got the aircraft back under control and took a few moments to decide if we were alive. At some point in this ordeal one of us got out a radio transmission of what was happening.

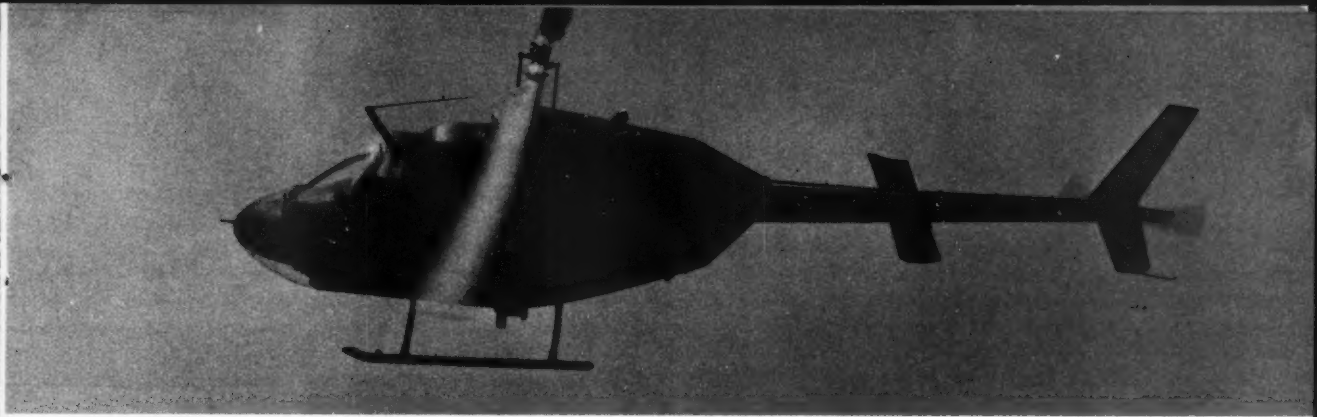
We were brought back into reality by Dustoff operations calling to see if we needed any assistance. For a moment we really weren't sure that it wasn't St. Peter heralding our arrival at the Golden Gates. After regaining our composure we orbited the mountain looking for another way to make the rescue. After 5 hours we gave it up and returned to Long Binh feeling letdown because we couldn't complete the mission. The next morning when the clouds cleared another aircraft from our unit made the pickup. To our joy we found out that the two men were still alive.

Since returning to the states I have frequently thought back to this mission and tried to analyze the decisions made. Yes, I can see errors where our inexperience could have lead to catastrophic results. But throughout life I have felt that it is necessary to attempt a task in order to find out if it can be accomplished, and when a human life is involved this philosophy burns a lot stronger.

To this date I am sure it was only a miracle that we survived this experience. I really can't say how close we actually came to the top of the mountain or exactly what our aircraft was doing for those few long seconds. All of the instruments were working correctly and were also set properly prior to takeoff. I suppose the only person who really knows what actually happened is the Being who was flying as our "copilot."



. . . the next morning when the clouds cleare
other aircraft from our unit made the
our joy we learned that the two men were



Turbine Trainers

Captain John W. Lahey

A NEW REVOLUTIONARY concept in helicopter training is being tested at the U. S. Army's Primary Helicopter School at Ft. Wolters, TX. The test program was initiated in January of this year and utilizes the turbined powered OH-58 Kiowa as the primary helicopter trainer instead of the piston powered TH-55 Osage training helicopter. In conjunction with the new aircraft an "individual proficiency progression" concept was introduced into the flight curriculum which eliminates a specific number of student flight hours for graduation. Consequently, the students of classes 72-25/26 completed primary II phase checkrides in fewer flight hours than the Primary Helicopter School's average.

This training experiment, termed the turbine trainer test, was conceived to gather training data that could be used in developing an optimum program of instruction (POI) for qualifying initial entry rotary wing aviators. Specifically, this test was designed to evaluate "proficiency progression" flight and academic curriculum concepts in conjunction with a turbine trainer helicopter. While it is still too early to evaluate the initial findings of the turbine trainer test, it does appear that it will provide data which could have significant impact upon future rotary wing aviation training.

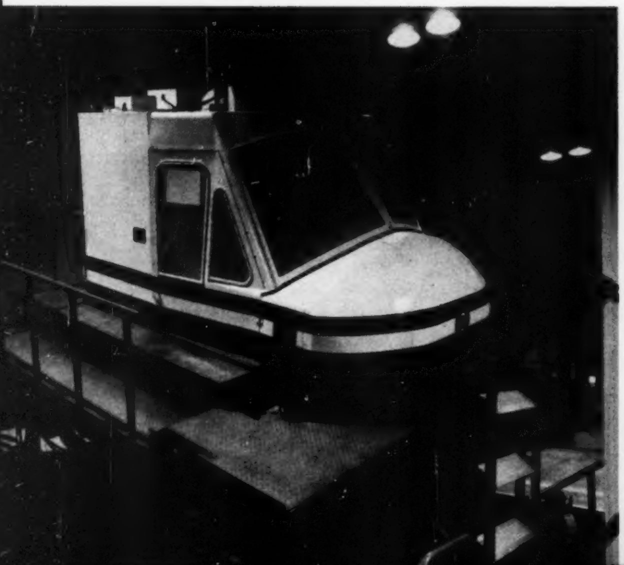
The complete turbine trainer test consisted of two separate test groups. Each test group was trained in two phases. Phase one of the initial test group began with classes 72-25/26. Students received their complete primary helicopter training at Ft. Wolters in the OH-58 turbine helicopter and progressed through the course under the proficiency progression POI. The second phase of test 1 continued at the U. S. Army Aviation School, Ft. Rucker, AL, in early April where 16 students (8 officers and 8 warrant officers) were randomly selected from the two classes to begin an integrated instrument and contact training exclusively in the turbine powered UH-1 Huey. Under the integrated training concept the student is given contact instruction in the UH-1 aircraft at the same time he is receiving instrument training, thereby allowing the student's knowledge of the aircraft and the knowledge of instrument flight procedures to develop together.

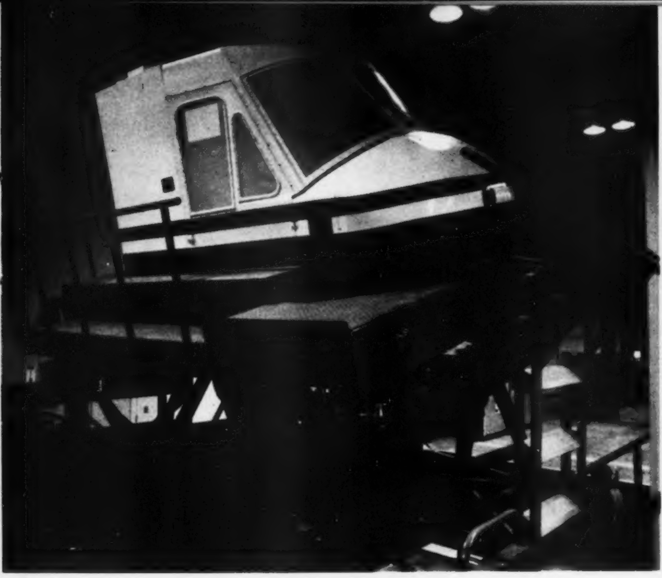
The second test group commenced with classes 72-39/40. Students began training during April at Ft. Wolters and also received their complete primary helicopter instruction in the OH-58 turbine helicopter under the proficiency progression POI. However, during the second phase of test 2 at USAAVNS in late July, 16 randomly selected students from these two classes (8 officers and 8 warrant officers) received instrument and contact training in the synthetic flight training system (SFTS) and the UH-1 Huey.

The SFTS is the highly sophisticated helicopter instrument trainer that has recently been developed for Army aviation. Through the use of its digital computers, memory cores, instructor pilot display consoles and the latest advancements in flight simulation devices, the SFTS can expand the learning process in instrument and contact training by providing the instructor pilot with capabilities not available in a training aircraft; i.e., "freeze action" and "instant playback." In addition, the student's knowledge of the aircraft is greatly improved in that the SFTS can simulate emergency conditions and corrective actions that could not safely be attempted in flight; i.e., governor failure, tail rotor gear box loss.

The information that is obtained from the turbine trainer test could have a far-reaching effect on the future conduct of Army aviation training. The end result of this test, as well as future tests, will be a more proficient and more professional member of the aviation team.

SFTS





The UH-1H is the "backbone" of the U. S. Army's aviation fleet and is among the aircraft whose flight characteristics will be simulated in the synthetic flight training system (SFTS)

Synthetic Flight Training System

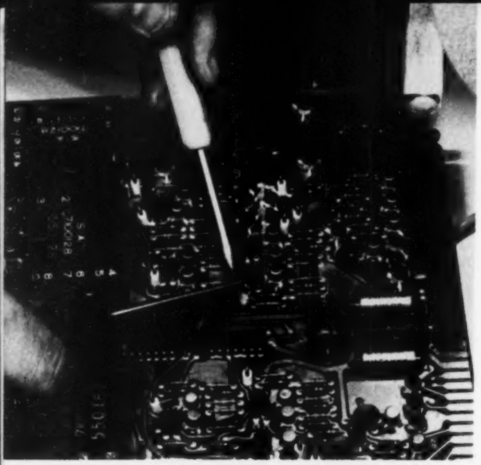
Story by Major Frederic H. Stubbs

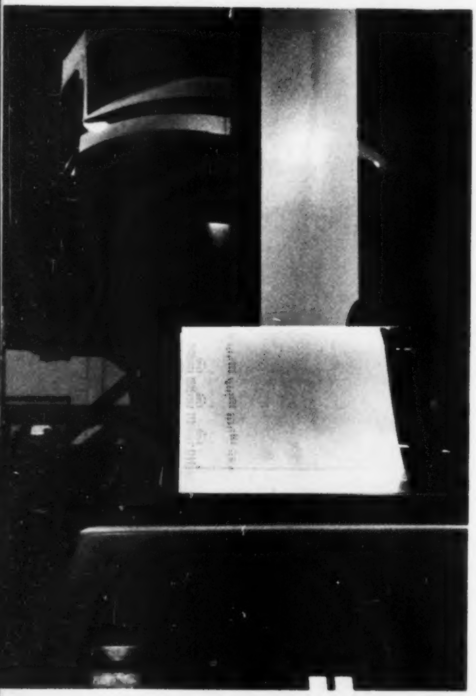
Photographs by Captain Tom Greene

> **"It appears that a combination of simulator/airplane training results in a pilot who is better trained than one trained in the airplane alone . . . it becomes more and more worthwhile to utilize ground training devices, particularly aircraft simulators, for training purposes"**
> **—FAA**

BATTERY—ON. Inverters—OFF. Main fuel—ON. "Fireguards posted. Clear! Battery voltage is good. TIC-TIC-TIC . . . igniters are popping—whrrr-BOP-BOP-BOP . . . looks like a normal start. *Normal start?* Far from it. This is a flight simulator.

In the "good old days" an instrument flight instructor with his orange flight suit and black baseball cap would wait anxiously for his student to complete the preflight inspection of the TH-13 so that he could show this kid fresh out of primary helicopter school just how much he still had to learn before he could win the title of "aviator." Not so today . . . the requirement for the TH-13 instrument trainer is rapidly diminishing because of the Army's new synthetic flight training system (SFTS)—a ground-based training device which adds a realism to instrument training never before even remotely approached in any flight trainer. In fact, it's so near the real thing that experienced pilots feel they are actually flying an aircraft.





What you see is what you get, and what you get in the module cockpit (right) is an exact replica of a UH-1H Huey cockpit except for the addition of required training equipment. Department of the Army personnel are currently being trained (left) as technicians who will have the capability of repairing any circuit card in the system, except for the cards in the 516 digital computer. The teletype looking "inktronic" (below left) provides a constant readout of the errors made by the student during the flight

To save time and money and to take advantage of the advanced technology the Army has embarked on a training program using high fidelity flight simulators. The SFTS will introduce into Army aviation training activities the latest advances in flight training device design and technology. This system will enable the Army to conduct desired instrument and standardization training, to include emergency procedures not safe to practice in operational aircraft and thus not able to be learned to high proficiency levels. The emergency procedure skills are those which are related to preparation of the aviator to deal—almost in routine fashion—with the unexpected events which could jeopardize mission accomplishment.

The primary justification for the procurement of the SFTS is that the flight simulators will enhance the training of aviators and substantially reduce training costs. The SFTS is not restricted to the desires of Mother Nature and her outside weather conditions. All weather conditions can be simulated in the trainer. In areas where snow, icing or continuous rain would virtually stop all aircraft the SFTS schedule of training would be unaffected. After a recent review of technological advances in aircraft simulation, the Federal Aviation Administration concluded:

> "It appears that a combination of simulator/airplane training results in a pilot who is better trained than one trained in the airplane alone. Simulators permit more concentrated training without

At first glance a person could suspect the square box like appliances on either end of the row (left) to be modern toploading washing machines, but closer inspection of one would reveal a high-fidelity looking record changer called a disk-pack. The disk-pack is a memory bank of all the information required for the operation of the SFTS. It is capable of storing 3.6 million words of which roughly one-third is in use at this time. The remaining capability is to be used for future programs

waste of time and effort and the trainee can be allowed to see and correct his mistakes without any detrimental effects on safety of flight. Therefore, it becomes more and more worthwhile to utilize ground training devices, particularly aircraft simulators, for training purposes."

The current SFTS development plan calls for a three phase sequential development program to satisfy the requirements. The first phase involved the development of one UH-1H unit subsystem which consisted of a four cockpit simulation facility. The second phase, to be initiated in first quarter FY 73, will involve the development of a CH-47 operational flight trainer (OFT) subsystem which consists of one cockpit with a visual device. The CH-47 OFT, put on a subsystem, will be the first time a visual device has been put on a helicopter training simulator in the armed services. An AH-1G COBRA-TOW OFT subsystem with a visual device is programed to be the third system, with development starting in first quarter FY 74.

Procurement and installation of seven additional UH-1H field unit subsystems are programed for the U. S. Army Aviation School (USAAVNS) Ft. Rucker, AL, and ultimately about eight more UH-1 and CH-47 subsystems are scheduled for worldwide distribution. The U. S. Continental Army Command is evaluating the worldwide requirement to include overseas commands.

The SFTS UH-1 subsystem consists of four cockpit modules, four motion platforms, one computer module and one instructor station. The motion platform is powered by hydraulic actuators which drive the motion platform with the fidelity of the actual aircraft.

Each of the four cockpit modules can be programed to perform independently such aircraft maneuvers as ground control approach, nondirectional beacon approach, instrument landing system approach, etc. Prerecorded briefings and instructions prepare the trainee for the training mission. Realistic, computer-controlled demonstrations of maneuvers and tape recorded commentaries enhance training value. This allows one instructor to train four pilots simultaneously. The closed circuit television (CCTV) in each cockpit permits the instructor to continuously monitor and record trainee performance. An automated, objective performance measurement system provides for trainee evaluation. A noise environment generator provides aural clues to the trainee to simulate all sounds normally associated with the aircraft operation. A 5-degree-of-freedom motion system provides acceleration cues in vertical, lateral, pitch, roll and yaw axes.

The first UH-1 prototype simulator model received by the Army was located at USAAVNS. Engineer testing was completed in November 1971 followed by service testing which was completed in January 1972. The UH-1H field unit subsystem was considered suitable for type classification by the U. S. Army Test and Evaluation Command (TECOM) on 17 April 1972.

During the service testing of the SFTS a "transfer of training" study was conducted. (All of the facts and charts addressed in this article were abstracted from *Transfer of Instrument Training and the Synthetic Flight Training System,* Dr. Paul W. Caro, February 1972, Human Resources Research Organization, prepared for the Office of the Chief of Research and Development, Department of the Army.) The trainees who participated in the SFTS test received the same undergraduate pilot training as their contemporaries, except that *all* instrument training was administered in the SFTS instead of in the TH-13T and the existing "blue boxes."

Sixteen trainees participated in this study. Using a table of random numbers, trainees were selected from among the 34 active Army members who had completed the primary phase of training of an officer rotary wing aviator course (110 hours contact training in the TH-55). These trainees had no prior instrument flight training and had relatively little flight experience before entering the Army pilot training program.

All instrument training was

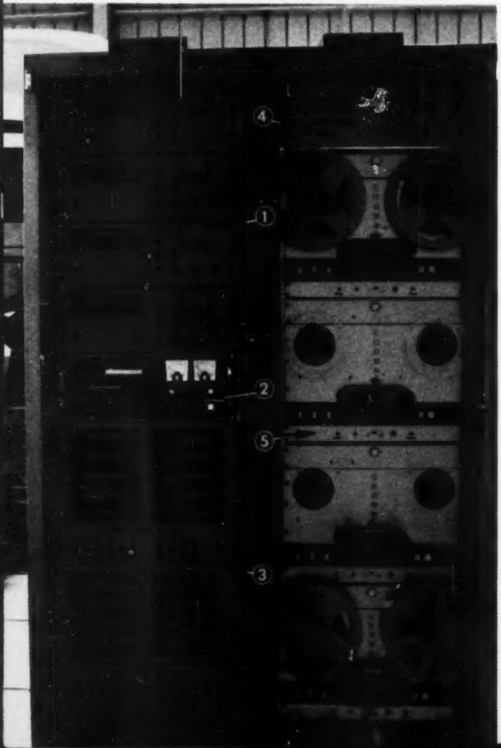
Poetry in motion is what the SFTS seems to be, as students put the cockpit module through her paces. In the foreground is a paper tape reader and punch used for maintaining current and introducing new programs

The instructor operator control console (above) is capable of monitoring the ground track of all four training modules simultaneously through flight progress displays. The instructor can introduce from this panel any of 101 malfunctions to include the most violent—tail rotor gear box failure. He is capable of selectively viewing and video taping cockpit activities through closed circuit televisions which scan over 80 percent of the cockpit. He can also give GCA approaches and landings. The audio tape cabinet (below) has five sections: *Section 1.* Five minute playback recorders . . . one recorder for each cockpit . . . allows the computer to take each trainer back in time and actually re-fly the last 5 minutes of flight for both student and instructor evaluation. *Section 2.* Auto pilot panel. SFTS is equipped with an auto pilot which can maintain the heading, altitude and air speed when required. *Section 3.* Audio alert panel. Recorded messages are keyed by the computer to the student's headset asking him to check heading, altitude, air speed or attitude whenever he is flying outside the normal flight parameters. *Section 4.* Communications recorder panel. Records student VHF and UHF radio transmissions for the last 15 minutes of the flight . . . as a check on proper radio procedures. *Section 5.* Automatic training tapes panel. Each cockpit has its own tape which contains ten automatic training periods. Automatic training is in three phases—

a. Demonstration Phase—a realistic, computer-controlled demonstration of instrument approach procedures using radio navigational aids such as VOR, ADF and ILS. The computer makes the full approach as taped commentaries tell the student what is happening.

b. Practice Phase—depending on which phase of training the student is in, the computer releases certain aircraft controls for student practice, i.e., from simple turns to approaches.

c. Adaptive Phase—the computer senses the skill level of the student, then adjusts the difficulty and complexity of the task to the student. As the student's skill level increases the computer automatically increases the operation difficulty.



conducted in the SFTS on a proficiency basis. Necessary instrument flight-related academic instruction was conducted under the supervision of each trainee's instructor pilot (IP) using programed textbooks. When the IP determined that his students met all proficiency required for an Army standard instrument rating, they were scheduled for instrument checkrides in the SFTS.

Table 1 indicates the amount of training received by each trainee in the SFTS. At the end of that training each student was given an instrument checkride in the SFTS by a qualified Army instrument examiner who had not participated in the study. The time required for conduct of the checkride and the checkride grade is also given in table 1. Two students did not pass the checkride the first time it was administered; both returned to their assigned IP for additional training, were given a second checkride and passed. Table 1 includes all training and checkride time required by these students. Army Aviation School policy is to assign the grade of 70 when any checkride is passed after having once been failed, regardless of the quality of the recheck performance.

The mean time required for these students to pass the required instrument checkride in the SFTS was 42 hours 50 minutes. Of this, 40 hours 28 minutes were devoted to training and 2 hours 22 minutes to evaluating student performance during checkrides. This compares to the total training and evaluation time scheduled for all conventionally trained students of 86 hours, 60 hours in the TH-13T, plus 26 hours of training time in the modified 1-CA-1 simulator device.

After passing the instrument checkride in the SFTS, these experimental trainees were judged qualified with regard to proficiency

Table 1

Training and Checkride Time Requirements and Grades of Students in the SFTS

Student Number	Training Time (Hours/Minutes)	Checkride Time (Hours/Minutes)	Total Time (Hours/Minutes)	Checkride Grade
1	33/15	2/15	35/30	89
2	35/00	2/00	37/00	82
3	35/00	2/00	37/00	84
4	37/30	2/00	39/30	73
5 a	39/00	4/15	43/15	70
6	40/00	2/15	42/15	85
7	40/30	2/15	42/45	90
8	40/45	2/00	42/45	91
9	41/00	2/15	43/15	90
10	42/00	2/00	44/00	94
11	42/15	2/45	45/00	89
12	43/00	2/00	45/00	92
13 a	43/45	3/30	47/15	70
14	44/00	2/15	46/15	80
15	45/00	2/00	47/00	82
16	45/35	2/00	47/35	86
Mean	40/28	2/22	42/50	84.2
Standard Deviation	3/41	/38	3/47	7.6

a. Students 5 and 13 did not pass the checkride in the SFTS the first time it was administered. Their performance was satisfactory on a subsequent recheck.

Table 2

Aircraft Familiarization and Checkride Time Requirements and Grades of Students in the UH-1

Student Number	Training Time (Hours/Minutes)	Checkride Time (Hours/Minutes)	Total Time (Hours/Minutes)	Checkride Grade
1	3/00	2/00	5/00	87
2	3/00	2/45	5/45	88
3	6/15	2/00	8/15	88
4	4/45	2/00	6/45	84
5 a	6/15	3/15	9/30	70
6	5/00	2/00	7/00	85
7	6/45	2/00	8/45	84
8	3/00	1/30	4/30	91
9	3/00	2/00	5/00	83
10	4/00	2/00	6/00	82
11	3/30	2/00	5/30	85
12	3/45	2/00	5/45	80
13	3/30	2/45	6/15	83
14	5/30	3/00	8/30	78
15	3/15	1/45	5/00	74
16	2/45	3/00	5/45	70
Mean	4/12	2/15	6/27	82.0
Standard Deviation	1/21	/38	1/31	6.2

a. Student 5 did not pass the checkride in the aircraft the first time it was administered; his performance was satisfactory on a subsequent recheck.

for award of a standard instrument rating. Present Army regulations, however, require that such an award be made only upon the basis of performance during a checkride conducted in an aircraft. Therefore, in order to conclude the test each trainee "transitioned" from the SFTS to an instrument equipped UH-1H (none of the trainees had prior experience flying the UH-1).

Table 2 indicates the amount of time devoted to this aircraft familiarization activity. Transition training was restricted to familiarization with the aircraft under simulated or actual instrument conditions, since it was presumed that all necessary instrument training had been conducted in the SFTS.

The aircraft time required for this transition training ranged from 2 hours 45 minutes to 6 hours 45 minutes; the mean time was 4 hours 12 minutes. It should be noted that a portion of the range of training times was attributed to the IP's judgment that some students needed more aircraft familiarization than did others. All of the 16 trainees satisfactorily passed the checkride on the first attempt except one who passed the second instrument checkride.

The fact that SFTS training transfers to actual aircraft operation is not surprising since it is a high fidelity simulator of the training aircraft. Airline experience with transitioning pilots to new commercial airline aircraft has shown that such equipment can provide effective training.

Because there is considerable confidence value in actual flight, it is not envisioned that the SFTS will eliminate the need for some aircraft flight instruction. However, the test program indicates that with properly designed equipment and training programs, much of the training now conducted in aircraft could be conducted more efficiently and cheaply on the ground.

Charlie and Danny's Write-In

Dear Danny: My question concerns U-21A and RU-21A aircraft, TM 55-1520-209-10/1 (June 1971) and accompanying checklist.

Why was the overspeed governor check changed in the 19 June 1971 edition of the manual over the previous publications? The present method for checking the governor closely resembles the commercial King Air procedure. We prefer the original procedure and would like to see it changed back.

CPT A. W. A.

Danny's answer: This change in procedure seems to have disturbed others as well because we have received many inquiries on this subject.

The procedures presented in the 19 June 1972 edition of the dash 10 will be changed back to the original method of checking the overspeed governors. Factory representatives tell us that one method is as effective as the other and it was decided to use the check as outlined in the March 1969 version.

A re-issue of TM 55-1510-209-10/1 with the above correction should appear on or about 1 September 1972.

Dear Danny: In looking through the new CH-47B & C manual, dated 10 December 1971, on page 7-29, paragraph 7-13b, I find that it reads: "A power turbine (NII) overspeed condition may exist, depending on power being used, when 238 rotor rpm has been exceeded by 5 percent for more than 5 seconds."

Also on page 7-3, paragraph 7-46b, I find a similar statement using 233 rotor rpm.

Danny, wouldn't it be simpler to use an rpm rather than require a computation? Example: A power turbine (NII) overspeed condition may exist, depending on power being used, when 249 rpm is exceeded for more than 5 seconds.

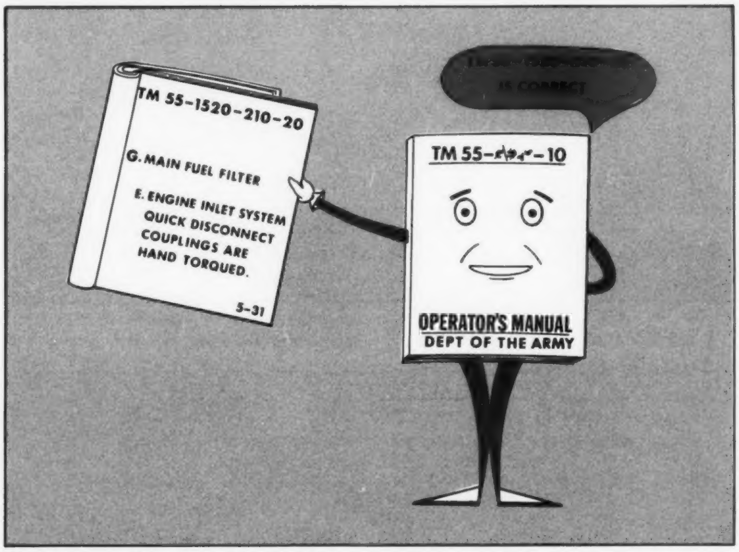
SFC J. F. S.

Danny's answer: You are correct; it is better not to require the computation. We had requested a similar change in a couple of places but we completely overlooked these two. Thanks for the DA Form 2028s, and we will see that they get to the U. S. Army Aviation Systems Command for inclusion in the next change to the dash 10.

Dear Danny: In the UH-1D manual (TM 55-1520-210-10) dated August 1971, section VI, paragraph 4-35, page 4-11, it states that in order to shut down the engine after a complete electrical failure, disconnect the fuel filter quick disconnect coupling. MWO 55-1500-202-30/1, line 7, page 5, dated February 1968 states to torque that quick disconnect coupling 16 to 25 feet pounds. TM 55-1520-210-20 says to hand torque it. Our UH-1s have torqued quick disconnects. What's right?

CW2 W. R. W.

Danny's answer: As you stated MWO 55-1500-202-30/1, dated February 1968, authorized the removal of the original type quick disconnect and installation of the present quick disconnect. This MWO is outdated and in error by stating to torque the quick disconnect coupling 16 to 25 feet pounds. A message is being sent out stating to hand torque the quick disconnect coupling. The maintenance manual TM 55-1520-210-20 is correct. TM 55-1520-210-10, page 4-11, paragraph 4-35, 1, states that the proper method for shutdown has been changed to read: "Disconnect main fuel line at engine fuel filter." This change will appear in change 2 to TM 55-1520-210-10. A future change will contain the caution: "A wrench may be necessary to disconnect the fuel line at the fuel filter."



The Power Of Positive Prevention

Captain Jon F. Langione

AS THE BRIGADE safety officer and his survey team members commenced their survey of the 941st Assault Helicopter Battalion, the battalion commander was deep in wishful thinking. His staff and his three companies had worked long and arduous hours getting prepared. They refined operations areas, repaired revetments and even fixed the flat tire on the crash rescue truck. The standing operating procedures got a thorough rehabilitation, along with maintenance records being shaped up. The maintenance hangars were GIed and had a look of efficiency that was sure to impress the team.

As the survey continued the battalion commander felt sure his personnel would leave a good impression. After all, the training had been geared up this past week and the officers and men of the 941st should be well versed in all aspects of the mission and operations of the battalion.

Upon conclusion of the survey the battalion commander was informed that a briefing for officers and senior NCOs would be held the next day at 1000 to go over the survey results. The battalion commander knew it was going to be a long night.

At 0945 the following day the officers and NCOs were standing around discussing the survey and, from all indications, it appeared things went well. The clammer and chatter stopped when the survey team entered the mess hall. The members of the battalion took their seats and the brigade safety officer stepped forward to address the group.

"Colonel Gaines, gentlemen—you are all awaiting the outcome of the survey, I'm sure. Well, I've graded the battalion excellent on the survey as a whole."

A rumble of voices swelled throughout the mess hall as the men acknowledged their satisfaction. The safety officer continued, "This survey was a test to ascertain the worth of surveys from the highest level. The officers and men of the 941st worked hard to prepare for this inspection. After all, you had 3 week's notice. The next survey we make will be an unforewarned type of inspection. The team will simply show up one day and start digging. This type of inspection will show us a truer picture, I'm sure. Commanders will not be afforded time to prepare paperwork that has been falling behind, or GI operations and maintenance areas, or for that matter fix a tire that has been flat for 2 months."

When the safety officer mentioned the flat tire, the battalion commander's jaw dropped and he twisted in his chair, hoping the survey team wouldn't embarrass him further.

"This is not an IG inspection, gentlemen," the safety officer continued. "The brigade commander will not review the survey; he desires a grade of satisfactory or above. Only in the case of an unsatisfactory grade does he wish to see the survey. The same may be desired by your group commander."

The battalion commander sighed with relief.

"I have some advice for you," the safety officer went on. "You have got to have a positive attitude toward all endeavors of the aviation community. Don't cover discrepancies for an inspection; correct them to prevent accidents. Maintenance areas should be free of hazards and clean, not to impress a survey team but to enhance safety and efficiency. This battalion has two aviators over the 90 hour maximum and no flight surgeon examination and release slip appear in the records. These little things can crop up and if not corrected can grow into a monster that will take weeks to set straight. Look to the future and prevent for tomorrow as well as today. I call it the power of positive prevention and it works. Try it for a month. I think you'll like the results. Thank you for your attention, gentlemen, and good luck in the future."

The battalion commander invited the team to stay for lunch after the meeting concluded and the survey team accepted. He wanted to discover who would be the poor devil to receive the unforewarned survey so he could warn him to give him time to prepare for the *surprise* survey.

The EXTRA Step

ANNUAL AWARD
Monthly Winner
CONTEST

Frequently we experience a wish to have something and, if it's not within our grasp or obtainable, then our longing for it is even greater. That's fine when we envision luxuries... but what about necessities we can have, yet don't, and when an emergency occurs without them our life is jeopardized...how deep is the longing then?

Captain David L. Grieger

AFTER THEIR first automobile accident many people become better drivers. Their accident wakes them up to the dangers of the road. They correct some of their bad driving habits and become more careful.

The same often happens to aviators. Once they go down, no matter what the cause, they seem to become better fliers. After the shock wears off they take a long, hard look at themselves and start taking that extra step that may save their lives during a future emergency.

I was one of those fortunate aviators who survived his first accident. It sure changed my attitude and the extra steps I took probably saved my life.

The first time I went down was after I had been in the Republic of Vietnam for 2 months with only about 150 hours of flying time. I was assigned as pilot to a senior aircraft commander (SAC) for low ship on a "sniffer" mission. We were to recon an area east of Quang Ngai on the Batangan Peninsula for a possible North Vietnamese Army base camp.

Several klicks out we dropped down to low level—about 50 feet above the trees. From that point a high ship directed our route of flight. Shortly after crossing the initial point we recorded several hot spots on the sniffer equipment. The operator ejected small white smoke canisters, and the high ship plotted these positions on his map. Just after crossing a small paddy area and flying along the crest of a ridge, the operator remarked, "Hot spot!" He then yelled, "Continuous hot spot!"

At that time short, sporadic bursts of gunfire were directed at our aircraft.

Suddenly the aircraft yawed right and the nose pitched down. I looked up and saw trees. The SAC applied aft cyclic in an attempt to clear them. I locked my shoulder harness and hung on; it was the only thing I could do. After clearing that particular tree the aircraft commander unsuccessfully attempted to regain air speed. We began to cartwheel violently to the right. Our rotor blades struck a tree and the aircraft flipped inverted into the trees.

The engine continued to run as the aircraft lurched like a fish out of water. The SAC rolled the throttle off and secured switches on the console. I turned off the battery switch . . . the SAC turned it back on . . . I turned it off again . . . we looked at each other (his helmet was gone) and almost simultaneously unlatched our seat belts . . . BAM! . . . headfirst into the green house.

I saw my .38 revolver and my camera at my right shoulder and picked them up. Then I crawled across the upper console, between the seats, under the sniffer machine suspended by straps from the floor of the aircraft, out the left cargo door, down a piece of main rotor blade and into a small clearing several feet away. All this took a little over 15 seconds.

The high ship touched down almost immediately in the clearing to pick us up. No one was seriously hurt and luckily there was no fire. However, had there been one and that clearing wasn't there for the other aircraft to land, we would have had nothing except our personal weapons and my "stateside" camera.

After returning to the company area almost all the "new guys" in the unit surveyed their equipment and put together makeshift survival kits. Most, like me, attached strobe lights, survival knives, pen flares, etc., with paper tape to our chicken plates. Most of the "old guys" just smiled for they had improvised similar concoctions months before . . . following similar experiences.

Several months passed and I became one of the "old guys." I had about 850 hours incountry. I was an SAC and still wore my makeshift survival kit, only I had added a survival radio which I carried in a claymore bag around my neck when I flew.

One day we combat assaulted a company-sized element into a mountain landing zone (LZ). Several hours later while discharging extractions on the resupply pad of the LZ, the S-3 air reported a medevac was needed for the unit we had airlifted into the mountains.

None of us were seriously hurt and luckily there was no fire. However, had there been one . . . we would have had nothing except our personal weapons and my "stateside" camera

No urgency was involved; a man had broken his leg climbing around the rugged terrain. The unit was reporting the area "cold," so I elected to go without guns and extract the victim.

Enroute contact was established with a forward air controller (FAC) OV-10 pilot who had made contact with the unit on the ground. He advised me of the condition of the terrain and that the injured man was located at a bomb crater . . . the only clear area within several hundred meters. He also advised that the area was "cold."

I remembered several weeks ago that we'd received substantial light to heavy automatic weapons fire from a nearby area so I flew enroute at 2,500 feet.

We reached the area and flew a left-hand high reconnaissance. Deciding the bomb crater was large enough to accommodate our UH-1H, I requested smoke. At that instant we started receiving steady bursts of heavy automatic weapons fire and taking hits.

Both door gunners immediately went hot on the position. Instantaneously, I lowered collective with forward cyclic to get to the treetops; I knew that UH-1s couldn't outrun .50 caliber slugs.

I was indicating 110 knots, diving and evading to the jungle treetops—and still receiving .50 fire. I keyed the mike and told the FAC I was taking heavy automatic weapons fire.

Suddenly the aircraft yawed. I heard the low rpm audio blaring. Segmented panel warning lights were blinking on. I lowered the collective and entered autorotation. The controls stiffened; we had to contend with hydraulic failure too!

Now the trees were coming up and we had no place to go except into the treetops. I flared and pulled up on the collective to cushion, then we impacted the trees indicating around 30 knots. The main rotor separated and the aircraft nosed over through the trees. I vaguely recall clinging to the cyclic and collective helplessly as we crashed our way, nose first, through the green blur.

We struck the ground on the left nose of the aircraft and I was almost pinned to my seat from cabin compression but none of us sustained serious injuries. We turned off switches and everyone left the aircraft.

Outside there was a wall of thick vegetation surrounding the aircraft. The engine compartment was steaming and fuel was trickling from the aircraft. We looked up and saw daylight through a very small opening in the canopy. Suddenly there was a whining scream and a flash of gray as the FAC made a low pass over our position.

I reached for my survival radio. It was gone! Then a vision grew in mind, and I could see the radio hanging uselessly above my bunk. For the first time since I procured it, I flew without my survival radio.

Cursing, I clambered into the Huey and found several smoke grenades among the debris. I walked on the remains of the wrecked aircraft, popped a smoke and tossed it several feet away. Yellow smoke billowed up and the FAC made several passes, revving his engines as he screamed by overhead.

We began making plans to move to a stream that we knew was at the bottom of the mountain.

I realized that the .50 caliber gun was quiet and had been since we had been on the ground. I suspected the NVA were moving it. They knew the FAC probably had fast movers orbiting close by. I heard occasional bursts of AK (assault automatic weapon) and semiautomatic fire that sounded far away. Then our attention turned to a "metal hitting metal" sound and brush rustling several meters into the bush. Friendlies couldn't have been reaching our position this soon. The closest friendly troops were at least several hundred meters away. We all looked at one another, gathered up what we could carry and decided to penetrate the thinest-looking part of the vegetation going downhill. I grabbed two more smokes and secured them to a snap-link on my chicken plate.

Among the four of us we had two M-16 rifles, two .38 revolvers, two .50 caliber cans of M-16 magazines, an aircraft first-aid kit and one XM-60 door gun with a belt of ammo containing about 150 rounds. The crew had dug most of this out of the wreckage while I signaled the FAC.

Sending my copilot ahead, I considered "matching" the aircraft, but I had a vision of burning fuel flowing downhill after us so I quickly discounted the idea.

We began making our way downhill, crawling and sliding on our backs under the vines and brush. After about 30 minutes I surmised we were at least halfway down the mountain.

A jet screamed low overhead, followed by his wingman. Panic tore through my mind as I had another morbid vision . . . this time of roasting in napalm or being dessimated by a 250 pound bomb.

Whether I actually heard them or just felt I had, I knew the NVA had found our aircraft and were now looking for us. We continued down the hill. I heard the familiar sounds of rotor discs beating the air, but they were too far to our right or we had traveled laterally from our wrecked aircraft.

We broke out into a small clearing about 15 feet in diameter. I looked at my Nomex. It was ripped and torn. I was thankful I had retained my Nomex gloves. Large ants were on all of us. I surveyed our gear. Everything I had including the smokes was still secured to my chicken plate.

My copilot went ahead while the

rest of us set up a small perimeter to rest. He came hurrying back and said the stream was about 50 meters ahead so we headed for it. As we set up positions to secure both sides of the stream we could see several slicks and a gun team circling about ½ mile up the small valley. I popped one of the smokes and threw it in front of us. Yellow smoke poured from it and billowed skyward.

Seconds later the FAC screamed by low level in his OV-10. When he saw us he waved his wings and gave us a "thumbs up." We waved back. The helicopters turned our way. The guns formed a racetrack pattern as one slick began a descending turn toward our diminishing smoke.

It was late afternoon and getting dusk, so I removed my strobe light and turned it on to keep our position marked. As the slick hovered by we jumped in and were off.

Thirty minutes later I was sitting in the battalion flight surgeon's office gulping down a soda. Later I heard the FAC had called air strikes on our wrecked aircraft, destroying it.

Thoughts were running through my mind a mile a minute: The aircraft impacted nose first so I knew the avionics were destroyed, but was I sure? How would the aircraft commander to whom the aircraft belonged feel about my getting his ship destroyed? What if we had been captured, or had to exchange fire? Among other things I reviewed the details of our experience.

I would like to suggest to pilots who are flying in combat or isolated areas that they take that extra step that may save their lives in an emergency.

- Procure a survival kit, whether its ready-made or not. Obtain such things as a survival knife, signal mirror, pen flares, strobe light, .38 flare rounds, etc. If possible secure a survival radio and don't forget to take it along.
- Fasten this gear to your chicken plate and wear it.
- When working single ship in an isolated area maintain radio contact with someone at all times. When not talking on intercom keep your selector on the frequency with which you have known radio contact; there's not much time to be switching knobs during an emergency descent.
- Carry plenty of smoke grenades in the aircraft.
- Wear your Nomex and gloves. The Nomex is tough and will stand up better than fatigues. Wear the gloves to protect your hands when traveling through dense vegetation.
- Finally, don't panic. Handle the emergency as you've been trained. On the ground make sound decisions and work as a team. Friendlies will be looking for you soon. Do your best to make it easy for them to find you.

EDITOR'S NOTE: Listed below are the current Federal stock numbers and authorization for survival equipment. If your unit doesn't have the equipment, talk to supply—*it is available*. Remember, accident reports show that people get out of the aircraft with what they are carrying on their person. The removal of survival equipment and other gear, including weapons, is an afterthought. So, ensure the equipment is worn *on your person*

NOMENCLATURE	FSN	AUTHORITY
Knife, Hunting, 5-in. blade, 9½ in. o/a	7340-098-4327	SB 700-50
Knife, Pocket, one 3¾" long cutting blade	5110-526-8740	SB 700-50
Signal Kit, Personnel, Red	1370-921-6172	CTA 50-901/2
Signal Kit, Personnel, (various colors)	1370-926-9387	CTA 50-901/2
Survival Kit, Individual, Vest Type	8465-177-4819	CTA 50-901/2
Light Marker—Distress	6230-067-5209	SB 700-50
Life Preserver, Aircraft Crew	4220-630-8714	CTA-50-901/2
Radio Set AN/URC-10	5820-858-5721	TOE/TDA
AN/URC-14	5820-752-5278	TOE/TDA
AN/URC-68	5820-832-9158	TOE/TDA
AN/PRC-90	5820-782-5308	TOE/TDA

Can These Two Puzzle Parts Solve Your Transponder Problem?

The author, an academic instructor with the Advanced Subjects Branch, USAAVNS, Ft. Rucker, AL, explains the operation of airborne transponders in easily understandable progression. Aviators unfamiliar with this equipment will find the article interesting and enlightening

Richard G. Harding, DAC

LET'S SEE, the transponder has added the greatest element of safety and simplification to air traffic control since radar itself. The electronic principle, design and operation of this equipment is obviously quite complex. However, the operation of the airborne unit by the pilot is really very simple . . . if. . . .

If first we deal only with mode 3/A operation and, second, if the transponder used is a simple off-the-shelf model (figure 1) which has very few controls.

Since the most widespread use of the transponder is for air traffic control using only mode 3/A, let's look at that operation with a typical simple control head. Recognize that the transponder is an airborne receiver/transmitter used to send back coded reply signals to a ground based interrogation unit of a secondary radar system? It is a device that only replies when interrogated. The reply signal is generated at the aircraft and provides a stronger signal than the primary radar echo. Additionally, secondary radar can overcome the following shortcomings of the basic system:

- Aircraft reflection areas vary with the size and configuration, thus limiting the effectiveness of primary radar.
- Primary radar display can be degraded by some weather conditions, especially precipitation.
- Ground clutter frequently impairs the radar display even though the radar equipment is equipped with moving target indicator (MTI) circuits to eliminate much of this.
- Primary radar echoes alone give no clue to aircraft identity since there is no coded display of the targets.
- Secondary radar is less vulnerable to blind spots in the antenna coverage pattern.

Since all aircraft are not required to have transponders, air traffic controllers will normally display both primary and secondary targets on their scopes (figure 2). In controlling aircraft in positive control areas where the transponder is a required piece of

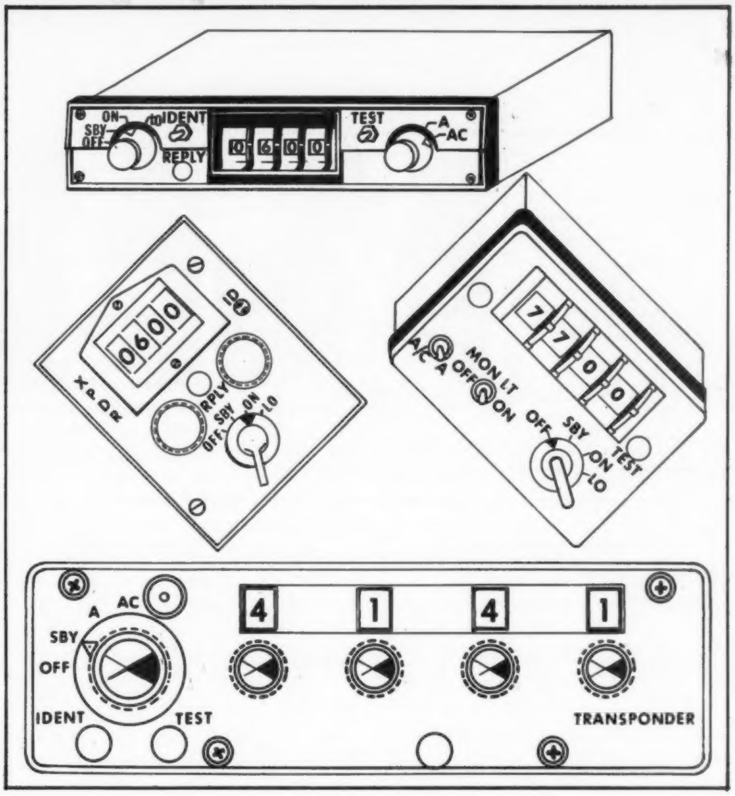


Figure 1 (above) represents some typical simple off-the-shelf transponders which have very few controls. Operation of these would require little familiarization

equipment, the controller can rid the scope of clutter by using only secondary radar (figure 3).

Most ATC facilities are now using a *select* scope which further enables the controller to see those aircraft squawking a *selected* code as a double slash, or an aircraft squawking other codes of mode 3/A as a single slash. An aircraft without a transponder or squawking standby appears as a "skin paint" blip (figure 4).

The double slash display [ ))] changes momentarily to a stretched pulse [◗] when a special identification circuit is activated in the cockpit. This switch is normally labeled *ident* or *I/P*.

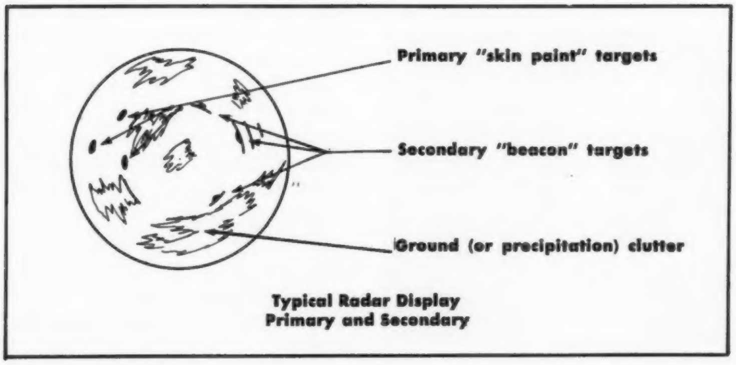
The unique design of the select scope enables a controller to make rapid identification of any target by any one of the following methods: squawking ident, changing code or squawking standby. The reappearance of the regular display when the aircraft is reassigned a code will further confirm the identity. This feature eliminates the need for identifying turns, which are necessary with nontransponder equipped aircraft.

By using certain codes for special ATC operations, each controller can see his transponder equipped aircraft as a double slash, with other aircraft in the area as a single slash. As seen in figure 5, all departing aircraft are assigned code 0400 and arriving aircraft assigned code 0200. This provides the controller with a discrete readout capability to simplify control. The code to be used will always be assigned by the controller except for the following, which would be used as appropriate without direction:

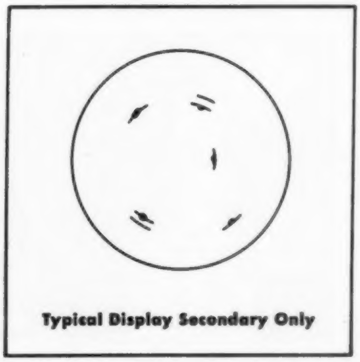
Condition	Code
VFR below 10,000 feet	1200
VFR 10,000 feet or above	1400
Emergency	7700
Two-way radio failure	7600

Figure 2 (below left) shows radar picking up targets as well as ground clutter and precipitation; the latter is frequently reported to aviators for safety of flight

Figure 3 (below), the controller can select transponder (secondary) returns only eliminating clutter but there is no return from raw "skin paint" and standby targets


Primary "skin paint" targets
Secondary "beacon" targets
Ground (or precipitation) clutter

Typical Radar Display
Primary and Secondary



Typical Display Secondary Only

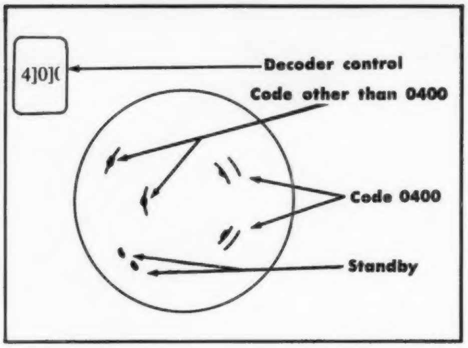
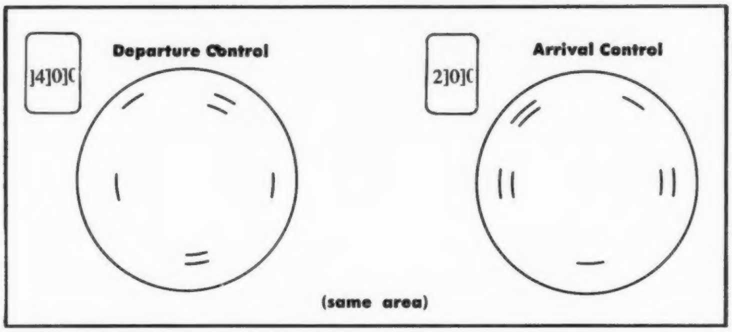

4]0](
Decoder control
Code other than 0400
Code 0400
Standby

Figure 4 (left), many ATC facilities are now using a select scope which has a decoder control to enable controllers to more readily "see" aircraft squawking a particular code

Figure 5 (below) presents departures assigned code 0400, left scope, while arriving aircraft 0200, right scope; area is identical


]4]0](
Departure Control
2]0](
Arrival Control
(same area)

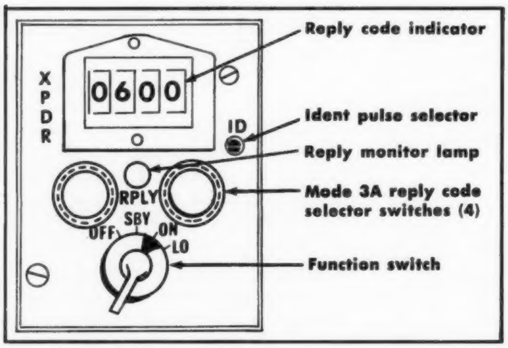
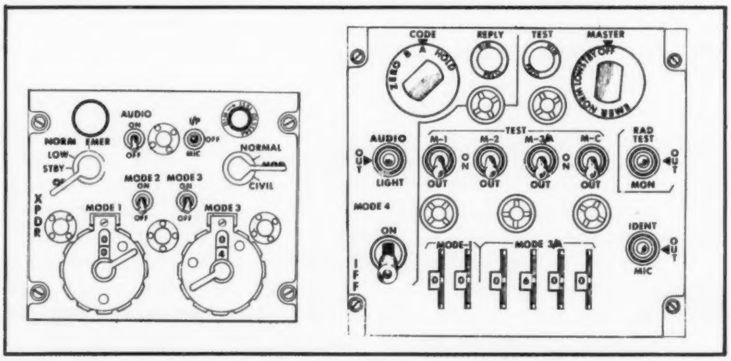

XPDR
0600
ID
RPLY
OFF
SBY
ON
LO
Reply code indicator
Ident pulse selector
Reply monitor lamp
Mode 3A reply code selector switches (4)
Function switch

Figure 6 (left), a typical transponder, simple with few controls and switches. The appearance of the set is uncluttered and operation is uncomplicated

Figure 7 (below), military transponders APX-44 and the APX-72 . . . designed to operate on more than one mode, dazzle aviators


AUDIO
ON
OFF
I/P
MIC
NORM
EMER
LOW
STBY
OFF
NORMAL
CIVIL
MODE 2
MODE 3
MODE 1
XPDR
CODE
ZERO
A
HOLD
REPLY
TEST
MASTER
EMER
NORM
LOW
STBY
OFF
AUDIO
LIGHT
OUT
TEST
M-1
M-2
M-3/A
M-C
ON
RAD TEST
MON
MODE 4
IDENT
MIC
IFF

The important point is: *Never squawk any other code unless directed to do so by ATC.*

Choosing the model shown in figure 6 as a typical set, let's see just how simple it can be. The function switch:

OFF—Off.

SBY—The standby position heats the tube filaments, keeping the set ready for use. This position is normally used for 3 to 5 minutes during warmup. The standby position should be used prior to takeoff and after landing, and at other times as directed.

ON—The transponder is on and will reply with selected code to interrogation signals from ground radar. This is the normal position for reply and is labeled *normal* on military sets.

LO—This is a special setting used to eliminate undesirable scope returns caused by spurous interrogation signals triggering the transponder when the aircraft is near the radar site. Set to LO only by the direction of the controller.

Code selection: Set as directed with the selector switches. Four digits provide 4096 possible code combinations; 7700 is the standard emergency code.

Ident feature: When instructed by controller to ident, momentarily depress the ID switch button; *do not hold on.* Special ident circuit pulses will be transmitted automatically for 15 to 30 seconds.

Reply-monitor lamp: This provides a visual indication of transponder operation. Set monitor light switch to OFF if not desired.

With such a few controls and switches, the operation is quite simple. The following is representative of many flight situations where the transponder is a big part of traffic control:

ATC—"Army 67735, cleared as filed, maintain 7000, departure control frequency will be 237.5, squawk 0400 LO just before departure."

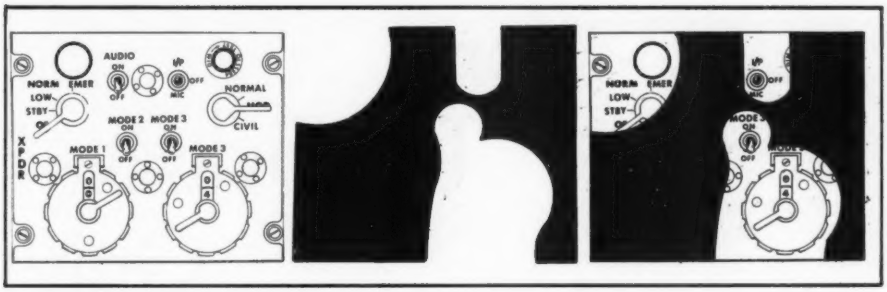


Figure 8, use of the small puzzle piece to simplify the initially confusing APX-44 appearance. Note the likeness to the more simple set in figure 6

Pilot action—With transponder on SBY, set code 0400 with selector, place function switch to LO just before departure. Change function switch to ON when instructed to squawk normal.

In subsequent control handoffs you will be told to change codes, to ident or possibly to squawk standby. With this simple control head you can hardly go wrong.

So that brings us back to our puzzle parts and the transponder problem. The problem very simply is that the military transponders are designed to operate on more than one mode, and the control head is filled with all sorts of switches and selectors to dazzle the aviator (figure 7). Now please pardon the repetition, but the most widespread use of the transponder is for air traffic control using mode 3/A (even for the military). So let's use the puzzle parts to make the APX-44 and the APX-72 as simple as the off-the-shelf models discussed earlier.

First, the APX-44. Set the controls as shown in figure 8. Then we place the puzzle part mask over the set as shown (note the similarity now with the basic set):

- The master control includes an emergency position, but the newer ATC radar equipment will not recognize this feature. Set 77 in the mode 3 window for full emergency reply coverage.
- The ident switch is labeled I/P and is spring-loaded to the off position. As stated earlier, do not hold on.
- The mode 3 switch can be placed to off to preclude squawking an undesired code when making code changes.

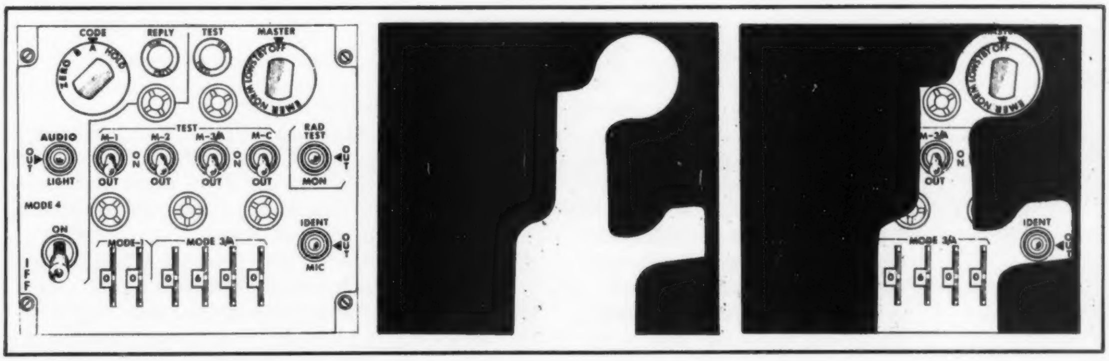
This set is limited to 64 possible codes in mode 3 (civilian mode A). When requested to squawk a four digit code, place first two digits only in code window.

Next, the APX-72. We'll set the controls as shown in figure 9 (left). Now we use the large part of the puzzle to mask off portions not needed as shown:

- The emergency position on this set will automatically activate code 7700.
- The ident switch is identical to the one used on the APX-44 but is labeled *ident.*
- The mode 3/A switch should be placed to out during code changes.
- The mode 3/A code selector is by thumb wheel and provides for full 4096 code capability.

Okay, how's that for simplicity? It may seem too simple. If you have familiarized yourself with all modes of operation you may be looking down your nose at those who need this gimmick, but it works. That is the important thing, and we don't have to remind you of those flights where you really felt relieved to hear, "Army 67735 . . . have you 3 miles south of Smithville; radar contact."

Figure 9, the APX-72 operation is simplified by overlaying the larger puzzle part on the panel drawing



```
MGE 35⦶250-⊕5H 67/62/2401/997
[redacted]
MXF M11⊕100⊕4HK 74/62/0000/995
LSF 40⦶80⦶E250⊕6GFH 66/62/1401/996
WRB O5GFH 64/58/1404/998
[redacted]
PAM 250⊕3HGF 71/68/0000/996/90001
NQA O3H 115/72/66/3302/988
[redacted]
NBG 250⊕4GFH 121/76/71/0000/988
[redacted]
NAB 250⊕3H 154/65/59/0902/999
[redacted]

ZCZCWNCLC079A 1101Z
SAUS 3 KAWN 091100
[redacted]
INR M20⊕20 49/45/0000/985
OSC 19⦶M30⊕13 56/49/0112G20/982
BLV 50⦶150⊕8 75/65/2204/984/VSBY LWR S-W/H ALQDS
GUS 250-⊕3HGF 58/55/0000/979
FFO 90⦶110⦶220-⊕5GF 59/56/0000/984/SC NW VSBY INCRG SLOLY
LCK 250-⊕5H 58/53/0000/984
FTK 45⦶100⦶250-⊕7 66/60/2102/984
HOP 50⦶E100⦶250⊕7RW-- 68/58/0000/987
BYH O5HGF 71/66/2102/988/AC ENE
NBU E250⊕5H 086/65/59/0106/980
TBN 250-⊕5H 69/62/2409/985

ZCZCWNCLC080A 1104Z
SAUS 6 KAWN 091100
TIK E100⦶250⊕10 70/59/2006/987
LTS E200⊕14 73/59/1304/986
FSI 160⦶250⊕20 72/54/1602/985
SPS E130⦶250⊕15 73/57/1710/986/H ALQDS
DYS 100⦶E250⊕15 65/54/2203/990
FWH E100⊕10 73/58/2004/988
GRK 30⦶E100⊕15R-- 70/62/1502/994
BSM 30⦶E80⊕7R- 71/68/0702/988/R- OCNLY R--
[redacted]
```

for Tac Tickets Only

The author offers meaningful and timely information for tac ticket holders anxious about preparing for the standard instrument card. The procedures and checklists presented are logical . . . with perseverance and by following these guidelines, any Army aviator should pass the instrument checkride . . . "no sweat"

CW2 Paul D. Elmore

SO YOU HAVE to get your standard instrument ticket! The word is out, and you, in a mild state of shock, round up a *few* publications. Let's see, you have an IFR Supplement, Section One, Two Bravo, Low Altitude Instrument Approach Procedures and a few DD Forms 175. After 2 hours of "pawing" through good old DOD FLIP, you suddenly realize you have forgotten everything you ever knew about instruments! Why does a 1,000+ hour aviator suddenly feel like a dummy?

Before we proceed ask yourself these questions (be honest now):

True or False 1. When I log "hood" time I really get it.
True or False 2. I never try to get other pilots to log my flight time.
True or False 3. I try to keep up with the latest DOD FLIP publications.
True or False 4. I make practice instrument or radar approaches every chance I get.
True or False 5. I know the frequencies of the flight service stations and how to use them.
True or False 6. I have current publications onboard during every flight—just in case.
True or False 7. I remember how to properly check out my ADF and VOR.
True or False 8. I know how to operate the AN/APX-72 and the AN/APX-44.
True or False 9. I knew question #8 meant the transponder!
True or False 10. I have not been completely honest in answering the above nine questions.

If you answered 1 through 9 "True" and 10 "False" you probably lied, but read on anyway!

First, let me explain. I am not an instrument examiner, nor am I an expert in instrument flight. I am, however, an aviator who recently earned a standard instrument rating.

Secondly, there just isn't any substitute for hard, serious work to prepare for a standard ticket ride. However, it does help to know what to expect during the checkride.

A *typical* examination is as follows:

I. ORAL EXAMINATION (The questions will vary greatly, but if you study for the annual writ, practice filling out flight plans and *know* minimums for destination and alternate airfields, you are well on your way.)
II. FLIGHT PLANNING (Have current publications and don't forget a computer.)
III. COPILOT BRIEFING (Remember A.I.?)
IV. BEFORE TAKEOFF (Use a checklist for this

phase—navigation radios, before hover, during hover, contact ground, etc.)

V. TAKEOFF (There is no requirement to make an instrument takeoff.)

VI. ENROUTE
  A. Level off checks
  B. Radio calls (radar and nonradar)
  C. Tracking
  D. Intersection fixing
  E. Holding
  F. Approaches (VOR, ADF, ILS and radar)
  G. Missed approaches
  H. Fuel checks
  I. Emergency panel and unusual attitudes

Now you're on the right track, but don't forget the AR 95 series. Here is a "homemade" checklist that will give you the *basic* library for study:

1. TM 1-225 (Navigation for Army Aviation)
2. TM 1-300 (Meteorology for Army Aviation)
3. AR 95-1,2,14,16 and 63
4. DOD FLIP
    a. Section I, II and IIB
    b. IFR Supplement
    c. Enroute Charts
    d. Low Altitude Instrument Approach Charts
5. Airman's Information Manuals, Part 1, 2, 3 and 4

PLEASE REMEMBER, THIS IS ONLY THE BASIC LIBRARY!

A DA message says that all aviators with a tac ticket must have a standard instrument ticket by 31 December 1972. My best advice is to get started now, *but don't try it alone*. Talk to your local examiner; he's the expert. Also, ask the U. S. Army Aviation School's Department of Nonresident Instruction at Ft. Rucker, AL, for the package designed to assist in preparing for the standard instrument rating (see AVIATION DIGEST, January 1972).

I'll pass on a few checklists (below and next page) which, if used, should help you get started. Good luck!

COPILOT BRIEFING

1. Check qualifications: A/C & INSTRUMENT

2. Brief on duties

When not on controls—

Copy all info received.
Tune and identify all nav aides & commo radios.
Keep position fixed on map.
Be prepared to take A/C and maintain heading, altitude and air speed.
Assist in instrument approach
Figure time to missed approach
Be prepared to take aircraft when visual contact is made and accomplish the landing.

Transferring control of aircraft
Lost commo
Monitor engine instruments

REQUIREMENTS FOR IFR FLT

Pitot heater
A/S indicator
Alt (sensitive)
Turn & Bank indicator
Clock w/sweep second hand
Compass (current calibration card)
Attitude indicator
Heading indicator
VSI
Suction gauge (if necessary)
Power Source operational
All the above must be lighted and operational
Radios for two-way commo, ADF, VOR if necessary
Marker beacon radio if necessary
Current nav, approach and commo pubs available to pilot in flight

REPORTING PROCEDURES RADAR (FLIP)

INITIAL CONTACT give
1. ID
2. ALTITUDE*
OMIT POSITION REPORTS unless requested
ALL POSITION REPORTS (FLIP) are still required

RESUME NORMAL PROCEDURES WHEN INFORMED "radar service terminated" or "lost"

***If climbing/descending state altitude climbing/descending to.**

HELICOPTER INSTRUMENT CHECKLIST

1. BEFORE HOVERING:
   - PUBLICATIONS: ONBOARD as desired
   - NAV RADIOS: CHECKED AND SET as needed
   - COMMO RADIOS: SET and then contact Gnd Cont
   - CLOCKS: SET to tower time and RUNNING
   - ALTIMETER(S): COMPUTE AND RECORD 'K' FACTOR(S)
   - HDG INDICATOR(S): CHECK with magnetic compass
   - ATTITUDE INDICATOR(S): SET for ITO
   - FORCE TRIM &/or CONTROL FRICTION: SET as desired
   - ANTICOLLISION LIGHT: ON
2. DURING HOVER:
   - VSI & ALT(S): Indicates DECREASE & INCREASE
   - TURN NEEDLE, RMI, MAG COMP: TURN R & L
   - ATT INDICATOR(S): NOSE H & L, BANK L & R
   - AIR SPEED INDICATOR(S): Indicates APPROX 0. Pitot cover removed
   - SLIP INDICATOR: BALL FREE IN RACE & FULL FLUID
   - ENGINE & TRANS INSTRUMENTS: CHECK normal range
   - ENGINE RPM: SET as desired
   - HOVER POWER: T/O POWER IS_________
   - TAKEOFF POWER: CHECK within engine limit
3. BEFORE TAKEOFF:
   - ATT INDICATOR(S). RECHECK
   - HDG INDICATOR: CH W/MAG COMP, SET INDEX T/O HDG
   - AIR TEM/MOISTURE: PITOT HEAT & HEAT/DEFROST
   - ENG & TRANS INSTRUMENTS: CHECK
   - RPM FOR TAKEOFF: CHECK
   - CARB HEAT: SET for climatic conditions
   - FUEL QUANTITY & T/O TIME: RECORD BOTH
   - CAUTION LIGHTS: CHECK
   - AUDIO WARNING: ON (if applicable)
   - RADIOS: SET on first usable freq/course
4. LEVEL OFF CHECK
   - ENGINE RPM & POWER: SET for cruise
   - ATTITUDE INDICATOR(S): SET for cruise
   - HEADING INDICATOR & MAG COMP: CHECK
   - ENG & TRANS INSTRUMENTS: Within NORMAL RANGE
   - CARB HEAT: SET for climatic conditions
   - CONTROL FRICTIONS: SET as desired
   - FUEL CHECK: QUANTITY NOW_________ AT_________ RECHECK DUE AT (15 or 30 min)___________ 45 min reserve at_________. Burn out at___________
5. PRELANDING CHECK:
   - ENGINE RPM: SET for landing conditions
   - FUEL QUANTITY: CHECK remaining fuel
   - ENG & TRANS INSTRUMENTS: WITHIN NORMAL RANGE
   - CARB HEAT: SET for landing climatic conditions
   - CONTROL FRICTIONS: SET as desired
   - CAUTION LIGHTS: CHECK
   - AUDIO WARNING: ON (if applicable)
   - COPILOT BRIEFING: COMPLETE

REPORTING PROCEDURES—NONRADAR (FLIP)

INITIAL CONTACT—no position report to follow
1. ID 2. ETA next reporting point 3. Altitude

INITIAL CONTACT—Position report to follow
1. ID 2. Position

POSITION REPORT—Includes departing holding fix
1. ID
2. PTA
3. Type flight plan (if reporting to FSS)
4. ETA next reporting point
5. NAME only next reporting point
6. REMARKS (as required)

DEPARTING AN ALTITUDE
1. ID 2. DEPARTING ALT

ARRIVE HOLDING FIX/CLEARANCE LIMIT
1. ID 2. PTA 3. REMARKS (as required)

STATION PASSAGE INBOUND
1. ID 2. (name of fix) INBOUND

MISSED APPROACH
1. ID 2. MISSED APPROACH 3. REMARKS (If requesting clearance to alternate, be prepared to give alternate, route, desired altitude, ETE, fuel remaining in flight time)

INSTRUMENT CORNER

Q. TM 1-225, dated December 1968, paragraph 14-7, states that "the final turn inbound from the holding pattern serves as the procedure turn, so the aviator could extend the outbound leg to lose altitude if necessary, provided he does not exceed the 10 miles prior to turning inbound." Does this give a blanket authority for aviators to extend all holding patterns? If not, when holding at a final approach fix (FAF) and cleared for an approach, when may an aviator extend the holding pattern to lose altitude?

A. 1. The statement in TM 1-225 is not a blanket statement for all holding and the rules which apply to this procedure vary.

a. If the "holding in lieu of procedure turn" pattern is depicted on an approach plate (figure 1), certain conditions according to TERPS (Feb 70) must be met as found in paragraph 234e. The holding pattern is a 1 minute pattern and should not be extended unless specified on the approach plate. Also, the pattern need not be extended because there should not be more than 300 feet to lose before crossing the FAF inbound.

b. When holding at an FAF on the procedure turn side and no holding pattern is depicted, an extended outbound leg poses no problem. The aircraft must remain within the designated procedure turn airspace. (This is similar to the problem presented in TM 1-225, paragraph 14-7, except the VOR in this case is not an FAF.)

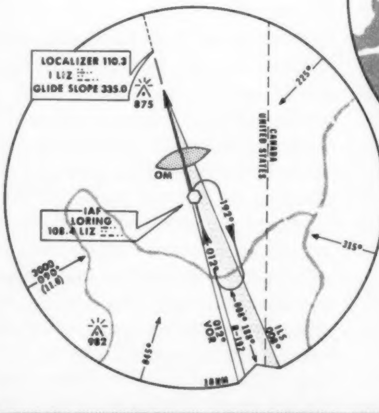
c. When a holding pattern is depicted with "1 minute" printed on it, extended legs are not authorized (figure 2).

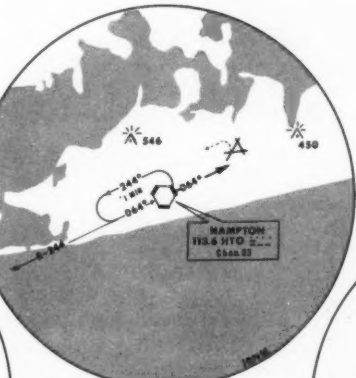
2. The clearance given and the information found on the particular approach plate are the largest governing factors as to whether or not holding patterns may be extended.

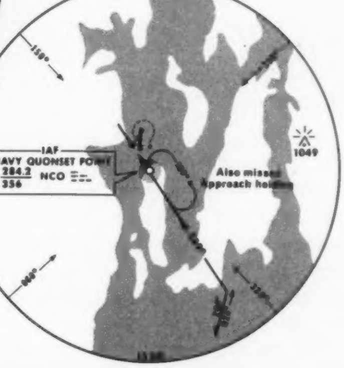
a. Descent from holding profiles would be a determining factor.

b. Holding at an FAF on the nonprocedure turn side such as arrival holding usually would require leaving the holding pattern and executing a procedure turn (figure 3).

3. Approach plates are under constant revision. Small discrepancies such as the statement "remain within 10 NM" (which tends to contradict rules stated above) are being removed when not applicable. Also, when descent from holding is authorized, many exceptions can be found where the altitude limitations (paragraph 234e, TERPS Feb 70) have not been complied with.


LOCALIZER 110.3
I LIZ
GLIDE SLOPE 335.0
875
225°
CANADA
UNITED STATES
OM
192°
IAF
LORING
108.4 LIZ
012°
315°
3000
090°
(11.0)
982
045°
012°
VOR
006° 186°
R-192
ILS
006°
10NM


546
450
244°
1 MIN
064°
064°
HAMPTON
113.6 HTO
Chan 83
R-244


150°
IAF
NAVY QUONSET POINT
284.2
356
NCO
Also missed
Approach holding
1049
060°
330°

Rationale

An Instructor

The pilot who is convinced he can salvage a maneuver is attempting to overextend his capability and may in the longrun suffer the consequences

ON MANY OCCASIONS I've observed from the stagefield tower and watched an attempted approach that was, shall we say, somewhat less than standard or normal. Yet, the student pilot will insist on taking the aircraft to the ground. "To the ground" meaning coming to rest upright somewhere between the intended touchdown point and the overrun. These are not only solo aircraft but also dual aircraft.

The failure here was not so much the approach itself but the determination of the pilot to continue the approach without executing a go-around. The decision to initiate a go-around rests with the pilot. Go-around! Go-around? Even in a student status you are still responsible for the safe conduct of the flight as well as the welfare of its crewmembers. In a dual aircraft you are acting as the pilot. You may not be the pilot-in-command but you ARE, in fact, the pilot. The dependence or reliance on the instructor for the safety of the flight should have started to diminish on the first day of solo. From that day forward, self-decisiveness and common sense should have become the order of the day. This, of course, is not the go-ahead for the instructor to become lax.

There are a few examples I can recall of students attempting an approach and after the altitude, air speed and ideas have dwindled down to nothingness, the student would look over at me as if to say, "You've got it!" Then in that split second of time does he realize that I'm glancing back at him with a look that says, "No I don't"? *Amazing* is the only word to describe the feats that the student can perform at that one particular moment. From this point on seat-of-the-pants flying becomes uncomfortable. This student is rare.

Let's take one of those not-so-hypothetical situations and apply it to a night dual training mission on a practice autorotation. It's one of those situations where judgment is overridden by various other reasons lined up in favor of giving it at least one more try.

Item: It's been a long day and night. You're tired.

Rationale: Well . . . I don't feel too bad.

Item: The cross wind is reporting over the limit for this aircraft.

Rationale: True, but the steady wind is under the limit.

Item: You only have about 15 hours in this bird.

Rationale: Yes, but I'm feeling comfortable and I've got plenty of time in other single engine helicopters.

6600 rpm, 1,100 pounds, instruments in the green, no lights, bleed air off. Base. Final. Lots of crab to stay lined up. Settle into the seat a little more firmly. Over the field boundary high...and hot, lights picking out details of the lane. Overrun lights flash *past*. The instructor knew then and there the student had misjudged his entry point but decided to let him ride it out to "teach the student a lesson."

Pitch down, throttle back. Rotor in the low green, gas producer 62 percent, we're still crabbing down the runway. The instructor just KNEW that the student would recognize that a power recovery was in order and almost in the same train of thought wondering why they never put relief tubes in the UH-1 as standard equipment. One hundred feet, decelerate and pitch pull . . . PITCH PULL!!! OH MY GOD, I'VE GOT IT! I'VE GOT IT! The instructor had a tiger by the tail, but never a thought of going around. "I'm going to make this dad-blamed, mule-headed monster do what I want it to, come hell or high water."

A burst of power on the throttle and pull in a few extra pounds of torque. The little beast had been properly outraged by such abuse and now has the bit in her teeth. The skids' rasping sound suddenly changes to a tortured yowl as the tail whips around. Landing lights slash through the blackness of the boondocks. A centerline stripe streaks lengthwise under the left chin bubble. The fuss ceases abruptly as the aircraft goes charging off the runway 90 degrees to the direction of landing, harvesting taxiway lights enroute. All has stopped.

A dry voice from the tower says, "You're cleared for that left turnoff."

Silence prevails in the cockpit. A guardian angel has made a rare personal appearance and settled firmly on the shoulder of the instructor for a chat. (His voice is similar to that of many instructors —sort of like gravel soaked in acid.)

"Thou art six kinds of an unprintable idiot."

"Yes, sir."

"Thou has not been that brainless since early flight school."

"No, sir."

"Getting thee lined up with that runway took special dispensation from Peter himself."

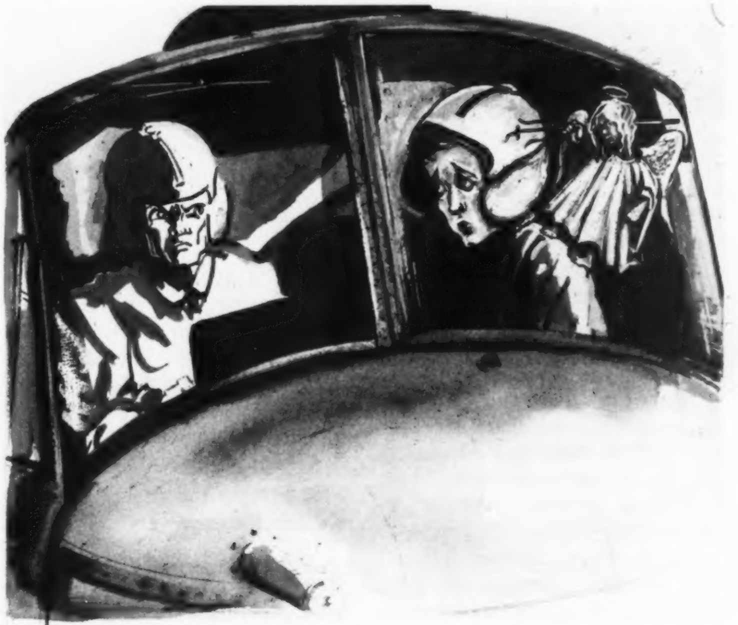
"Yes, sir."

"Has thou have anything to say in thy behalf?"

"No excuse, sir."

Long ago an old, experienced instructor of mine said that one either lands to a runway or arrives at it. The view from the tower at times reveals that we tend to do nothing more than just arrive.

The pilot who is convinced that he can salvage a maneuver is, in reality, attempting to overextend his capability and may in the long-run suffer the consequences. ***Let's not let complacency override good judgment and safety.***



FRENCH ARMY aviation (Aviation Legere de L'Armee de Terre or ALAT) is very much like its counterpart in the U. S. Army. It is not a part of the Air Force nor is it a separate branch of the Army. It has the mission of increasing the capability of the ground forces in the fields of intelligence, combat and mobility.

Prior to Army aviation as we know it today, hills, high ground and similar vantage points were used to observe the enemy. These, of course, were not always satisfactory. To improve their observation capability, the French took to the air as early as 1794. They used observation balloons in the battle of Fleurus (Belgium) against the Austrians and found them to be satisfactory.

In the early days of World War I, airplanes played a major role as observers in the French Army. It was due primarily to the reports of "aerial observers" that General Gallieni in 1914 decided to launch the "VIth Army of Maunoury" against the right flank of "Von Kluck's Army." This proved to be the decisive action that gave him the victory in the Battle of the Marne.

Improvements made it possible for aircraft to do more than just observe. They soon were engaged in combat and fought their own battles in the air.

After World War I the French Air Force was created. By the outbreak of World War II, support by the Air Force had deteriorated to the point that only a few of the reconnaissance squadrons had "Army observers." The Germans, on the other hand, had "sneaker" units (aerial observers) adequately adapted to the combat units. These proved a constant restraint to French Army units.

The lack of observer aircraft was partially corrected in 1942 when the U. S. equipped each artillery battalion of the French "Armee d'Afrique" with two Piper (L-4) aircraft. The pilots were Air Force while the observers were Army. They took part in the campaigns of Italy, France and Germany.

It was the endless growing need for "above the ground" observation in the Indochina and African campaigns that made aviation what it is today in the French Army. In 1947 three units (mostly equipped with Pipers) were created to do reconnaissance and artillery adjustment in Indochina. The need for these type units was so great that they were quickly asked to support all the fighting units, act as guideships, perform search and rescue missions, do radio relays and evacuate casualties.

In 1950 the first helicopters joined the Pipers. After that the number of aircraft in the Indochina theater increased rapidly and in 1952 an "Army Aviation Helicopter Group" was formed. The Army and Air Force worked the aircraft together and even some women got in the act. Mrs. Valerie André, an Air Force medical officer, participated as a pilot flying medical evacuations in the combat zone. When the French Army left the area, helicopters had evacuated so many people that it was said "they were the only aircraft that saved more lives than they destroyed."

During the Algerian War, French Army aviation was separated entirely from the Air Force. It became known as "Light Aviation of the Army" instead of "Artillery Observation Light Aviation" to better underline its mission to support all branches.

By 1958 all combat operations were being planned with airmobile assaults into the very core of the enemy sanctuaries. The number of helicopter operations increased and helicopter units were put in action in all combat areas.

The SA 330 (PUMA) is being assigned to French Army units as an assault helicopter in place of the obsolete CH-21C. This new helicopter has a speed of 140 knots. It can carry 12 fully equipped soldiers or an external load of 5,500 lbs

Reprinted
by permission of
TAM
(Terre Air Mer)
Paris, France

AVIATION In The French Army

The ALAT serves all branches of the Army with observation, attack and assault helicopters. To modernize the service, SA 341 (GAZELLE) helicopters and SA 330 (PUMA) assault helicopters are being introduced. Armament consists of wire-guided SS-11 missiles, but studies are now being made to equip the aircraft with more versatile armament

Left: Alouette IIs (SA 318) are light liaison and observation helicopters and are used in command and control, for gathering intelligence and plotting strike areas. Below: The new SA 341 (GAZELLE) will replace the Alouette IIs as a light helicopter

In "Constantinois" the 2nd Helicopter Group consisted of 160 aircraft of which more than 100 were CH-21Cs. In Oranais and Algerois assault helicopters were manned by the Air Force and the Navy. The number of units continued to grow until there were 25 "Division Army Aviation Units" of which 15 were mixed fixed and rotary wing aircraft. They were spread all over the Algerian theater. At the same time Army aviation units took part in the "Suez Operation" and in the smashing of the enemy assault against the Bizerte Naval Air Base in Tunisia. The number of aircraft employed at that time was about 1,000—all of which were returned to France with the disengagement.

The first division Army aviation battalion was created in March 1961 and the first Army Corps Army aviation group in February 1969. By this time "Army aviation" was fully integrated in the "Field Maneuver" and "Territorial Defense" forces.

French Army aviation is headed by a general who is responsible for the combat readiness and the technical and tactical training of aviation specialists. He is also the advisor to the Army chief of staff for all matters relative to organization, employment and use of Army aviation, the training of personnel and the development of material. Directly under this general are three schools where military and technical training is given to officers and enlisted men:

- The "Instruction Center of Army Aviation Specialists" (Le Center d'Instruction des Specialistes ALAT or CISALAT) is located in Nancy. This school has the task of basic military training for all draftees and basic aviation instruction of enlisted men in flight support subjects (ATC, mechanics, etc.).

SA 330s (PUMAs) come in as a unit

- The "Army Aviation Specialization School" (L'Ecole de Specialisation de L'ALAT or EA ALAT) in Dax provides basic pilot training for officers and NCOs. It also gives helicopter flight training to personnel of the Air Force, Navy Civil Population Corps, Gendarmerie, customs officers and foreign students.
- The "Application School of Army Aviation" (L'Ecole d'Application de L'ALAT or EA ALAT) in Le Luc near St. Raphael teaches advance tactical flight training courses to the UTTAS—SA 330 (PUMA) helicopter.

Between the Army aviation command and the field units are intermediate units such as Army aviation groupments and Army aviation corps commands which ensure technical control of aviation personnel. In addition, Army aviation corps commanders are advisors to the commanding general of the Army corps for Army aviation employment. In the Field Maneuver Forces there are two types of units. First, there is in each division a division aviation battalion (GALDIV) with four platoons:

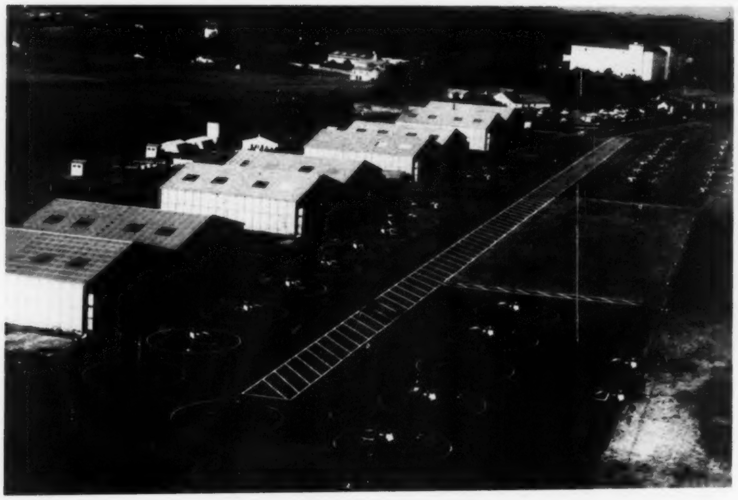
- Two liaison observation platoons each with 10 Alouette IIs (SA 318). Their missions are liaison, command and control, and reconnaissance.
- One attack helicopter platoon with 10 Alouette IIIs (SA 3160). Each of these helicopters has gyrostabilized optical devices and SS-11 wire-guided (M-22) missiles. These units have the task of killing tanks.
- One assault helicopter platoon with 10 UTTAS—SA 330 (PUMA). The other type unit in the Field Maneuver Forces is the Army corps aviation group (GALCA) composed of three companies:
- One liaison observation company of 15 Alouette IIs (TURBOMECA ASTAZOU JET ENGINE).
- One attack helicopter company of 14 Alouette IIIs armed with SS-11s.
- One assault helicopter company of 20 UTTAS SA 330s (PUMA).

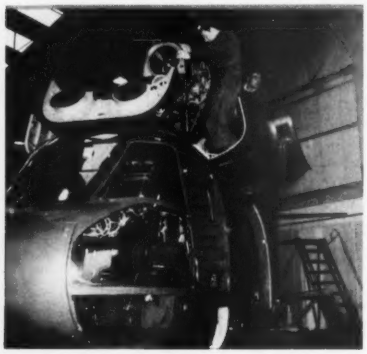
The ALAT is now required to serve all branches of the Army. Its mission is very much like aviation in the U. S. Army. Light helicopters are used in command and control, gathering intelligence, detecting nuclear targets, plotting strike areas and monitoring the level of poststrike radioactivity. Alouette IIs are used for this purpose but are scheduled to be soon replaced by SA 341s (GAZELLE).

Attack helicopters (mostly Alouette IIIs) in the ALAT are equipped with SS-11B1s and special optical devices. At 3,000 meter range they can hit and destroy any kind of tank known to be in service. Since this armament is limited to antitank warfare, new designs and studies are being made to equip in addition the aircraft with more versatile armaments (20 mm rockets and others).

The SA 330 (PUMA) is being assigned to units as assault helicopters, in place of the obsolete CH-21C. PUMAs are capable of flying up to 250 Km H (140 knots)

Alouette IIIs are attack helicopters. Some have gyrostabilized optical devices and SS-11 (M-22) wire-guided missiles. They can also be equipped as rescue and ambulance helicopters





Left: A partial view of the "Army Aviation Specialization School" in Dax. Basic pilot training is taught here. Above: Aviation mechanics at the "Material School" at Bourges

and can carry 12 fully equipped soldiers or 2,500 Kg (5,500 pounds). Assigned to the GALDIV and GALCA, the new aircraft are upgrading the airmobility of these units—making possible quick airlift of units, tactical deployment of specific materials such as tactical nuclear weapons, transportation of heavy materials over battlefield obstacles and medical evacuations.

In 1970 the 750 French Army aircraft flew around 160,000 hours. Of this, 70,000 were for schools and the rest in tactical units for training, field exercises and general purpose flights.

Included in the general purpose flights was that done by ALAT task forces performing disaster rescues in Peru, Martinique and Pakistan.

One month in Peru, three Alouette IIIs made 50 medical evacuations, air lifted 320 people and transported 45 tons of material. This was accomplished in very difficult conditions in which the aircraft were required to fly and land at more than 9,000 feet.

The ALAT also participated in various civilian type activities in France. In 1970 the organization flew 1,250 hours in highway and road control and traffic surveys during the peak period of summer vacation. Three helicopters have been attached permanently to hospitals at Rouen, Montpellier and Toulouse.

Recruits may specify and be assigned to aviation when they enlist. Enlisted men may also be assigned to aviation by lateral transfer from other services after serving 2 years in their original branch. All enlisted men, including NCOs, attend initial rotary wing courses at ESALAT in Dax. After graduating they are assigned directly to aviation units.

After being with their units for a year, pilots return to the EA ALAT in Le Luc for 3 weeks to qualify as tactical pilots. This course consists mainly of tactical flights performed lower than 100 feet in combat environment.

With their units, pilots are expected to improve their qualifications by participating in extensive combat qualifications. They are able to move up to the following positions:

- Instructor pilot. To qualify they must satisfactorily perform as instructors in a school and/or in a unit after a special course at Dax.
- Tactical chief pilot in Alouette IIIs with missile gunnery qualifications.
- Chief pilot in an assault helicopter SA 330. Before the NCO pilot qualifies in this type aircraft he must be fully instrument in the Alouette IIIs and take a transition course on the SA 330. This requires about 6 months of instruction and more than 100 hours of flight.

Officer pilots receive extended training aimed at making them able to adjust air and ground fire and to command in battle. Unlike NCOs, officers are not allowed to a full career in Army aviation. They must return to their branch periodically for 2 year tours. Each branch assumes the management of its officers even during Army aviation assignments.

Mechanics are trained at the "Material School" located at Bourges. Maintenance of all aircraft used in the French Army are taught at this school. At the end of the course NCO mechanics are assigned to Army aviation units.

French Army aviation has paralleled U. S. Army aviation in many ways. It is not a separate branch and has the same general missions. It was unknown at the beginning of the century, half foreseen at the end of World War II, increasingly expanded and is now taking a greater place in ground combat.

What Is A Learning Center?

Story by Captain Lance Millonzi

Photographs by Captain Tom Greene

The sign of the times in education circles is self-paced, individualized instruction. This is exactly where the emphasis is being placed at the U. S. Army Aviation School's Learning Center located at Ft. Rucker, AL. All phases of aviation oriented subjects are now being offered to include air traffic control subjects and POR qualification instruction

THIS IS USUALLY the second question asked by those having stumbled into the Learning Center at the U. S. Army Aviation School (USAAVNS), Ft. Rucker, AL. The first question generally is: Where do we sign up for the college courses?

There are more than a few people who have confused the Learning Center with the Education Center. In fact, it's not too farfetched to confuse the two, since learning and education are somewhat synonymous.

The Learning Center places emphasis on self-paced, individualized instruction that is used for additional, supplemental and remedial instruction for courses taught at Ft. Rucker.

This concept didn't originate at Ft. Rucker, but it has picked up increasing impetus in recent years. About 2 years ago USAAVNS formed an ad hoc committee to determine the feasibility of having its own Learning Center. It was decided, due to the large number and variety of courses taught at the school, that implementation of a Learning Center concept was needed. In January 1971, after 6 months of thorough planning and preparation, the Learning Center opened its doors.

At first the few lessons offered were limited primarily to rotary wing training with emphasis on instrument subjects. Yet every day more lessons are being developed for pilot transition courses, enlisted flight operation courses, air traffic control (ATC) courses and the other enlisted courses taught at the school.

Instruction at the Learning Center offers several different media, the most popular being in movie format. Here the individual study carrels contain a super 8 mm automatic sound projector which is self-contained having a screen the size of a small television. The film used is contained in cartridges for ease of handling and operation, each cartridge holds 20 minutes of uninterrupted viewing, but may be stopped anywhere if the student needs to catch up with his notes. The system is unique in that it uses standard super 8 mm film and has a small magnetic strip attached to it for the sound track. As of now this media pertains strictly to instrument flying, the subject area most difficult for student aviators.

Another media commonly used is the favorite all-American pastime: television. The Learning Center maintains certain popular or frequently requested lessons on video tape; also available are two video tape players used to "broadcast" our own shows. Students also can request any of the thousands or more TV tapes retained by Ft. Rucker's educational television library. The lesson is broadcasted at a preset time, on a preset channel to be viewed in the Learning Center on a television monitor.

While we're still on the subject of television, here's a sneak preview of what's to come. The greatest developments in the audio-visual field have been made in color television, using small video tape recorders. In fact, many different institutions including USAAVNS are slowly changing to this novel technological media. Small color video tape monitors, used in conjunction with a small color TV in each carrel, greatly increases the availability and quantity of subject material. This allows the student to watch his desired lesson without having to wait for other lessons already being televised. Unfortunately, one is not able to view "Sesame Street" or "The Electric Company."

Another fairly new method of instruction used at the Learning Center is the sound/slide system. The sound portion of the system is provided by a cassette recorder and the slides are viewed on an ordinary 35 mm slide projector. Each sound/slide lesson ranges in length up to 120 minutes and contains a maximum of 140 slides. The sound/slide lessons are easily modified for new or changed information by substituting a new slide or a new tape. Although most of the sound/slide lessons correspond closely with the platform instruction, they differ in that only pertinent subject matter is presented. Whereas most classes are 50 minutes long, the majority of our sound/slide lessons average only 15 minutes. Due to the condensed material in these lessons they are very helpful for review.

One of our proudest teaching aids at the Learning Center is an invention of one of our "genius" instructors. Basically, it's the cockpit section of a UH-1 Huey helicopter made up of many discarded parts and plenty of elbow grease. The device is used primarily to teach the student starting and runup procedures, but the designer has been able to simulate any function connected with the engine and the electrical power system of the aircraft. This trainer

Far left: Cockpit section of UH-1 Huey is used for starting and runup procedures. The device was designed by an innovative instructor at the Learning Center. Center: Two students utilize the same training aid for checklist familiarity training. Below: A student operates two tape recorders with extracts from DOD flight information publication provided by the Learning Center

In addition to supplementing most instructional programs conducted at the U. S. Army Aviation School, Ft. Rucker, AL, the Learning Center has study material for the FAA military flight competency test (below), and data of interest to civilian and dependent college students (right)

FAA MILITARY
COMPETENCY TEST

has no doubt saved many needless and costly hours of starting and runup in an actual aircraft. This brainchild was in fact such a success that the Army Participation Group of the Naval Training Device Center is considering building a sophisticated prototype based on the Learning Center's training. The device is also a great success with the students who learn to impress their instructor pilots with their knowledge of the cockpit. But occasionally while students are using the trainer one wonders—because of erratic control movements and strange gleams in their eyes—if they aren't taking a little time out to chase the Red Baron.

About 10 years ago the programed text became popular in many of the school systems in the United States. USAAVNS immediately realized the great potential of this new way of teaching and quickly had lessons incorporated into programed text for use in classes. The Learning Center stocks about 87 different texts covering many different subjects. The programed texts are available to all and may be worked in the Learning Center or in the privacy of one's home or billet.

The Learning Center also employs the instruction media most familiar to us. This is the oldest form of instruction and still the best: *the instructor*. The Learning Center retains at least two instructors available at all times. Although they may not know everything, together they can aptly cover each subject area. If they can't find the answer they'll find someone who can. Most of the instructors are ex-instructor pilots well versed in instrument flying. There also are several noncommissioned officers who were once platform instructors and are well qualified in the aviation maintenance field. We are proud of our instructors; they show a definite interest in helping the individual and they are never satisfied until the student is satisfied.

In the Learning Center's first month of operation —January 1971—attendance numbered less than 200 students. In 3 months the monthly attendance had increased to 500 students and in less than a year it reached 1,600 per month. In November 1971 the Learning Center reached one of its early milestones by acquiring its 10,000th student, First Lieutenant Walton D. Stallings Jr. The 20,000th student used the Learning Center facilities on 7 July 1972.

Remember to drop in at the Learning Center next time you're at Ft. Rucker; it has plenty to offer. Besides supplementary local instruction for nearly all programs taught at the USAAVNS, it also can help the old pilots who are studying for the annual writ or instrument renewal. As an additional enticement, we even have a 10¢ cup of coffee.

CHECKLIST SENSE

Major Chester Goolrick

Aviation people have been known to take pencil and shears to the prescribed checklist, performing drastic surgery . . .

UNLESS YOU are one of those addle-pated souls who like to part with their hard-earned salary checks in the shortest possible time and the most unprofitable way, you don't buy wrist watches, mink coats or diamond rings from shifty-eyed strangers who sidle up to you on street corners. When you put solid cash into a major investment you want an equally solid guarantee that what you are getting is all wool and a yard wide. You're one of those level-headed citizens who insist on kicking all the tires before they buy a used car, even taking the heap out for a spin to make sure its steering wheel doesn't have a regrettable tendency to come off just as they are turning on to the freeway.

As Ichabod C. C. (Cautious Cal) Tutwiler, the sage of Chipmunk Falls, VT, once observed: "Feller's got to be a goldurned fool to buy a pig in a poke."

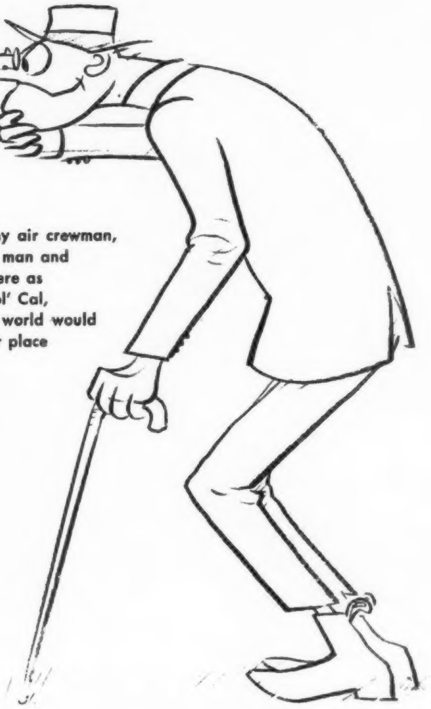
If you stuck around ol' C. C. long enough you might also hear him mention something about the wisdom of looking before you leap, not venturing out on ice without making sure how thick it is, and making a point of counting the teeth of the elderly horse you are thinking of buying. Cal wasn't born yesterday, not by a matter of 90 years or so. He's picked up a thing or two along the way, particularly when it comes to keeping body and soul together and his six-figure bankroll all in one piece and growing.

Cal doesn't hold much brief for heavier-than-air machines he has heard some people say can be made to fly. He gave up on the internal combustion engine when Henry Ford stopped turning out Model Ts, and he has never been much higher off the ground than the elevator at the Chipmunk Falls First National and Corn Exchange Bank will take him. All the same, if you could get him to grasp the idea of the absolute need for thorough and uniform preflight checklist procedures in Army aviation he would back you all the way. He started being cautious when he was 2 years old, after he burned his finger on a hot stove, and he hasn't got into anything since without checking it out thoroughly from stem to stern.

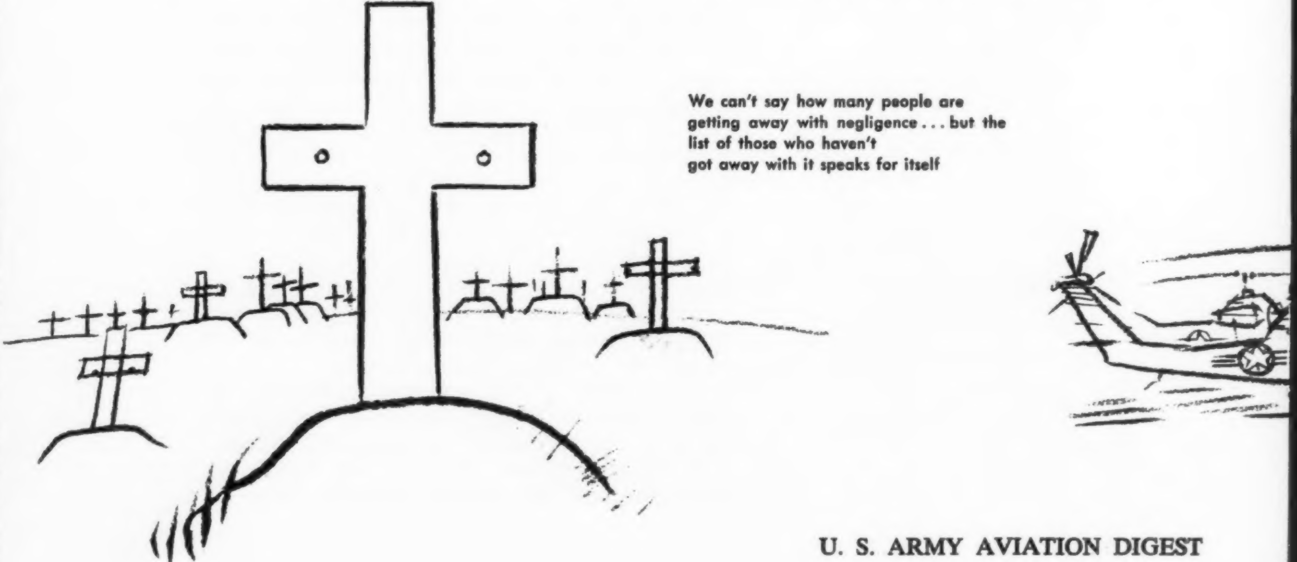
TCH, TCH

If every Army aircrewman, maintenance man and supervisor were as cautious as Cal when it comes to checking things out, the Army aviation world would be a happier place. Unfortunately, 'taint so. There's just enough statistical evidence, like the part of an iceberg which appears above the water, to show that preflight checks are sometimes being handled on a hit or miss basis, with the accent being on the miss more often than not. We can't say how many people are getting away with negligent—*there's* an ugly word for you—check procedures. So *far,* we can't, that is. The list of those who haven't got away with it speaks for itself.

The list among other things shows that when it



If every Army air crewman, maintenance man and supervisor were as cautious as ol' Cal, the aviation world would be a happier place



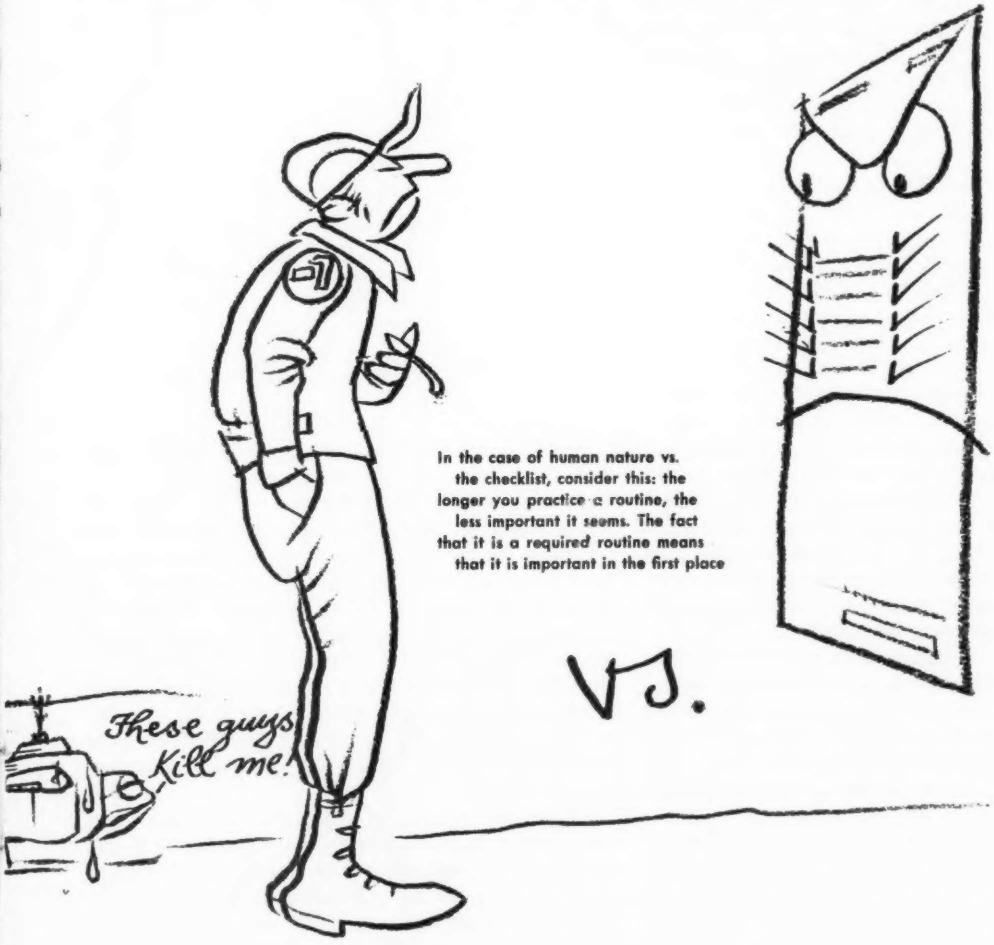
We can't say how many people are getting away with negligence . . . but the list of those who haven't got away with it speaks for itself comes to preflight, what at the start seem to be insignificant items are just as important as the ones even your Aunt Ella would be sure to take note of. Nearly everybody would be reluctant to take off if a tail rotor could not be located or the instrument panel was upside down. Take a look now at some mishaps brought on by overlooking the not-so-minor details:

- Gradual loss of No. 2 engine oil pressure in an RU-21D brought on a precautionary landing. The starting point? The pilot had failed to secure the oil cap. The oil siphoned out of the oil filler cap. Preflight failure.
- Because the pilot did not check the circuit breakers prior to takeoff, the flap and gear circuit on a U-8D breaker was left out. Naturally the gear wouldn't retract. Preflight failure.
- A precautionary landing was made when an OH-6A engine oil bypass light came on. If the pilot had bothered to check the oil level before takeoff the light wouldn't have come on. Preflight failure.
- A U-6A landed on a road strip to unload passengers, failed on its takeoff attempt and crashed into a truck. The pilot had omitted checking the trim settings. Preflight failure.

That should be more than enough to drive home the point that as important—critical is a better word—as thorough preflights are, they aren't being done *all* the time and *every* time the way they should be. Yet everybody knows and has been told over and over again what a proper preflight is. What goes on here, for Heaven's sake!

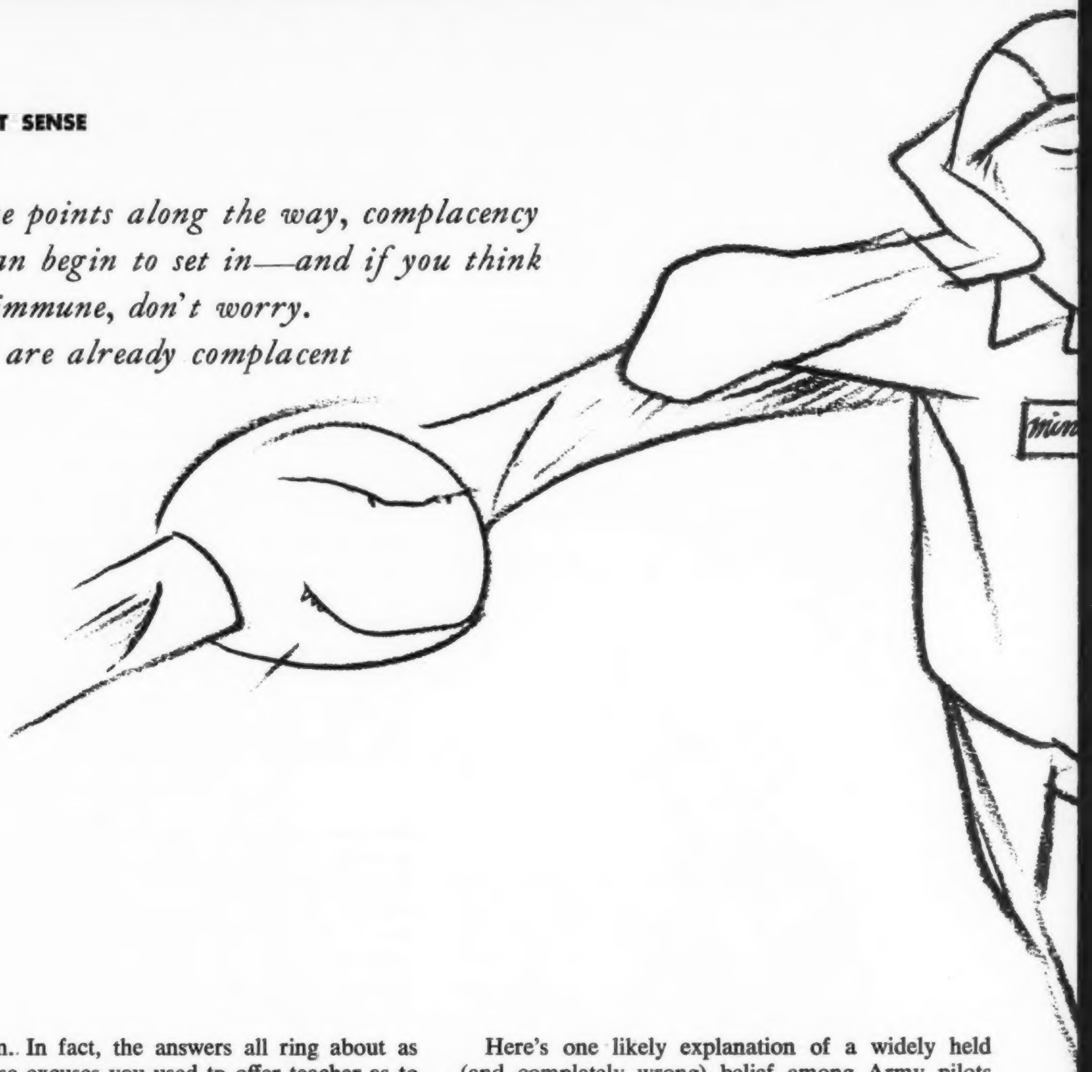
ROGUES' GALLERY

There are all kinds of answers, none of which on close examination holds any more water than a bucket somebody has ventilated with a 50-caliber



In the case of human nature vs. the checklist, consider this: the longer you practice a routine, the less important it seems. The fact that it is a required routine means that it is important in the first place

At some points along the way, complacency can begin to set in—and if you think you're immune, don't worry. You are already complacent



machinegun. In fact, the answers all ring about as true as those excuses you used to offer teacher as to why you weren't in school on the first day of the fishing season. You are fooling nobody, including yourself, when you skip or do an inadequate job on a check because of too much pressure, not enough time, fatigue or a self-induced idea that the checklist isn't all that important in the first place. You are just another victim of human nature which we are all burdened with from birth and which has been getting people into hot water since Adam and Eve found themselves on the sidewalk in front of the locked gates of the Garden of Eden.

In this case of human nature vs the checklist, consider this:

THE LONGER YOU PRACTICE A ROUTINE, THE LESS IMPORTANT IT SEEMS. THE FACT THAT IT IS A REQUIRED ROUTINE MEANS THAT IT IS IMPORTANT IN THE FIRST PLACE.

Here's one likely explanation of a widely held (and completely wrong) belief among Army pilots that checklists for most aircraft are too long, too detailed and not worth the time and patience they require in the face of an important task which should have been finished yesterday at the very latest. If there is one thing most people haven't enough of, it's patience, the sterling quality which keeps human nature from getting completely out of hand. The checklist is one of the first things which go out the window when time and patience run short. In a depressing number of cases, when the checklist goes out the window so do the pilot and his crewmen, sooner or later.

There was mention of negligence a bit back. Isn't that a little rough? Getting up in the morning is bad enough as it is without a man having to face himself in the shaving mirror and admit he has been guilty of negligence about the preflight on occasion—even if he has got away with it as clean as a whistle so

far. All of us can get careless once in a while, or forgetful, but that truly isn't the same thing as negligence. Or is it? A bank cashier who forgets to lock the vault at night because he is looking forward to a heavy date with Miss American Pie may not be in exactly the same category as the one who leaves it open because he doesn't give a hoot whether the cash assets are there in the morning or not. They do share one thing. They might as well send out engraved invitations to the local chapter of the International Bank Robbers Union.

Negligence can appear in as many disguises as the late Boris Karloff. Complacency is one. It is all the more dangerous because it can come along as a sinister partner with experience the way rheumatism does with age and wisdom. Youngsters aren't bothered with it. If they haven't found out for themselves how little they know, some kind soul usually is going to go out of his way to tell them. You don't have to beat a novice over the head with a baseball bat to convince him he will do well and live a lot longer if he follows procedures and techniques which have been tried and found true by trained men who have been down the road before him.

At some point along the way, complacency can begin to set in—and if you think you are immune, don't worry. You are already complacent. Once you are complacent, or if you develop a runaway case of it, you have already acquired the kind of attitude which can lead you to convince yourself that checklists are something dreamed up by a bunch of old mossbacks with fuzz in their ears simply as a means of making life tedious for Army airmen.

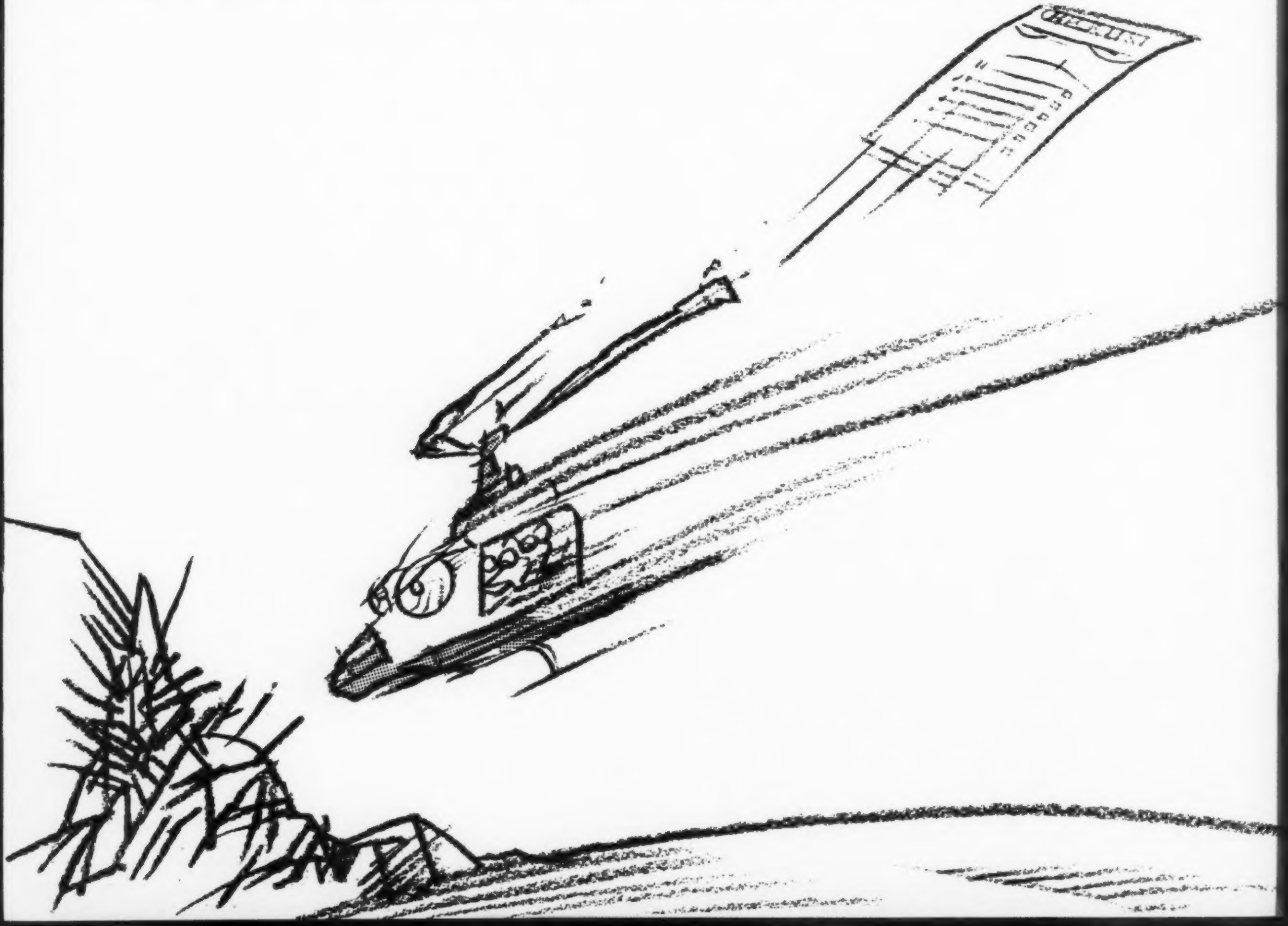
More than once you have probably heard somebody say he has the checklist so thoroughly engraved on his mind he could recite it backwards and forwards and six ways for Sunday without dropping a stitch. His wife will tell you he can't remember a short grocery list for the space of time it takes him to back the car out of the garage, and that unless she writes it down and pins it on his coat lapel he is as likely to come home from the store with a live alligator as the steak she wanted.

Every now and then some near-genius who has memorized the Encyclopedia Britannica and can spiel it off from Alpha to Zed without missing a comma pops up as a guest on a late night TV talk show. The chance of the rest of us being asked to do the same is about equal to that of being invited for a personally escorted tour of the Great Wall of China by Chairman Mao. If you run into trouble with a grocery list and annually forget your wedding anniversary or your wife's birthday, what are the odds that you will overlook some item in a detailed checklist—particularly the 11-page one for test flights with their before, during and after provisions? Just about zero, right?

To be sure, if you stick around Army aviation for a while, you will become familiar with the checklist, even thoroughly familiar. So familiar, in fact, that you can become an easy victim of complacency and fall into that ho-hum attitude which can do you in. You overlook a checklist item at just the moment fate decrees that it needs the kind of attention you expect from your doctor when you have come down with double pneumonia. No use suddenly remembering it after you are aloft and your turbine starts giving off noises remindful of an antique coffee grinder.

Carelessness, or complacency, concerning the checklist probably stems from the fact that relatively few checks, no matter how detailed and careful, turn up anything seriously wrong. So why bother when the odds are with you? Why go to your dentist twice a year? One veteran pilot who retired recently after 6,000 hours in the air in and out of combat noted the other day that there had been only two times in his entire career when a check showed something which prevented takeoff. That's not the point. If he hadn't spotted the trouble the first time there wouldn't have been a second. If he hadn't nailed it the second he never would have totaled 6,000 hours. He didn't allow complacency to hang around his neck like a tombstone. He is puttering in his rose garden and playing golf today because he was a fuss-budget from start to finish when it came to preflight.

Complacency isn't the only item on the list of potent checklist troublemakers. The self-satisfied soul so far gone in complacency he might as well be walking in his sleep has a deadly double first cousin in the menace to society who has been persuaded by an overdose of human nature that he not only knows everything he needs to know but knows it better than most. Operating on the usually sound theory that no matter how good something is it can be made better, people in the grip of this kind of self-hypnosis have been known to take pencil and shears to the prescribed checklist, performing drastic surgery which leaves them with a Readers Digest version with more gaps in it than a 6-year-old's



smile. Our feckless friends will tell you proudly that their home-grown versions not only save time but get things done just as well. What actually gets done in some cases is something else again. Done to a turn you might say.

Before we found out better we used to say that some people were born accident-prone, and some had fairy godfathers who put in a longer working day. That way you could explain without losing too much sleep why pilots who had a history of accidents or mishaps were only operating under their own unlucky star. The only remedy was to give them a job flying a desk where about the worst thing which could happen to them would be catching their finger in a stapling machine.

Sure, some people *are* accident prone. So are bowling pins. The man who sets himself up to be knocked over, who sticks his head out to be chopped off and who allows complacency or know-it-allness to lead him into procedures the book would never condone, is asking for what he is sure to get. Luck and fairy godfathers haven't anything to do with it. You just might have a fairy godfather, at that. But you can bet he is going to be out to lunch the day you fall down on your preflight. A fairy godfather can be asked to do only so much and no more.

TUNED TO A T

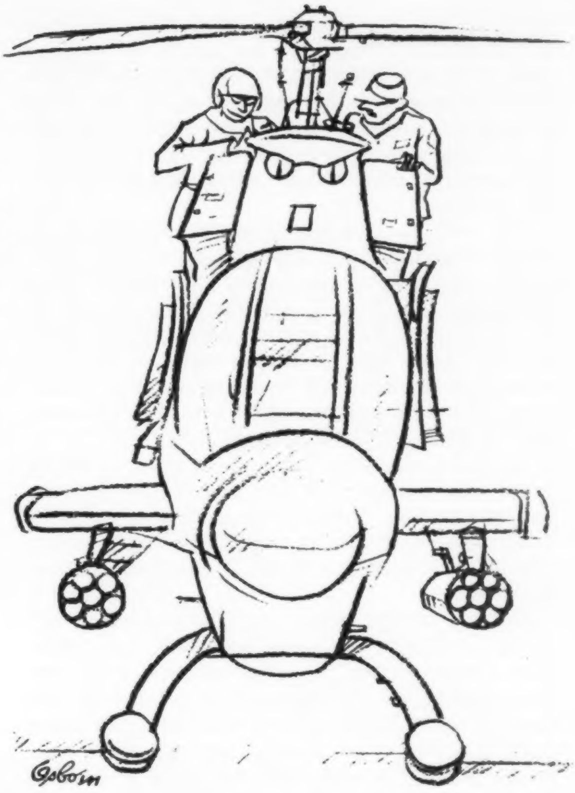
Neither can an Army aircraft. Your faithful helicopter is no better than the man who flies and maintains it and if it is being asked to perform with an oily rag lodged somewhere in its craw, something a thorough check would have turned up along the line, it can't be blamed if it falls down on the job.

How did the rag get there in the first place? Generally the blame can be laid at the door of improper maintenance procedures. Sloppy procedures which a proper check would have caught well before the nick of time.

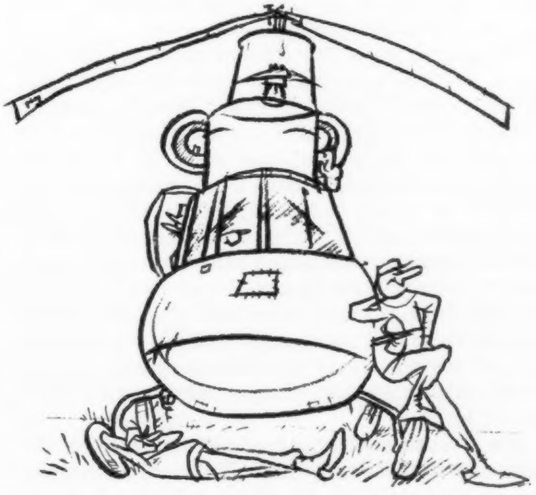
Service personnel come blessed, or cursed, with the same lavish helping of human nature as other mortals, including pilots. They react the same way to fatigue, pressure, anxiety, extremes of discomfort and dim-witted self-satisfaction.

The best of them can and do make mistakes.

All top-flight Mr. Fixits know this. Like mature



Aviation personnel come blessed, or cursed, with the same lavish helping of human nature as other mortals. They react the same way to fatigue, pressure, anxiety and dim-witted self-satisfaction



pilots, they are keenly aware that their capabilities and experience have their limits and that they have to maintain a constant, all-points lookout against the creeping complacency and overconfidence which can turn them into zombies before they know what has hit them.

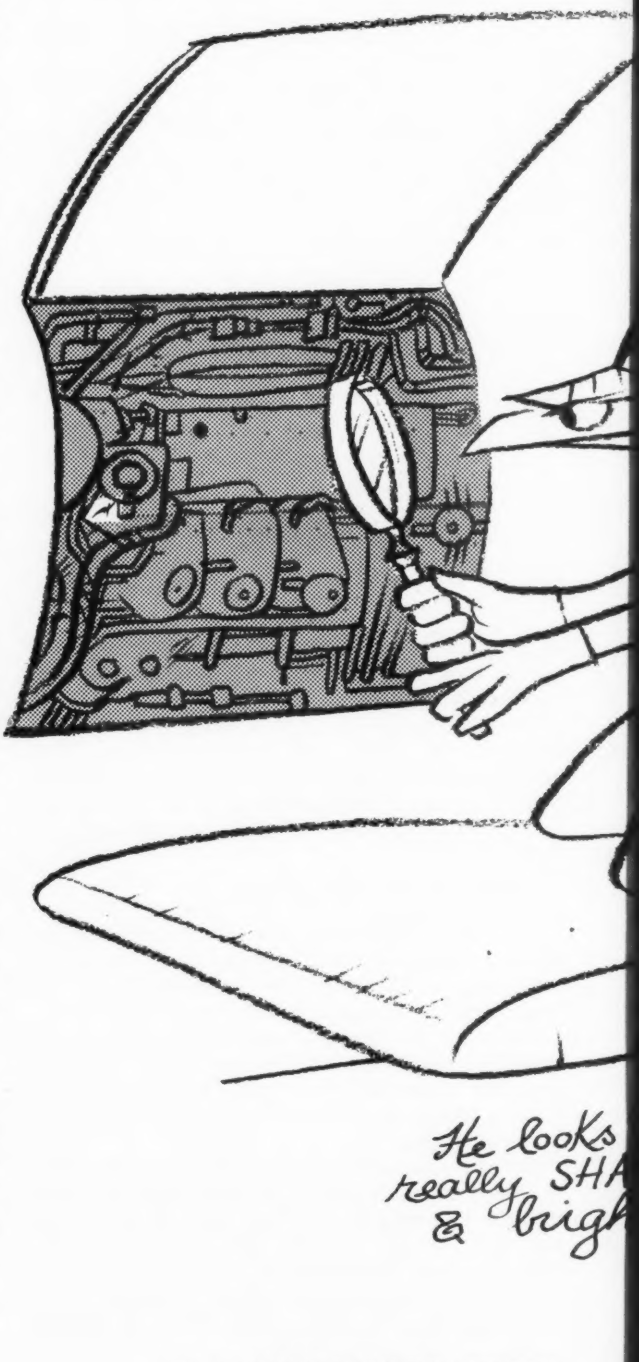
One thing the true expert knows and repeats to himself when he cleans his teeth three times daily is that while improvising is fine and dandy for a jazz pianist at a New Year's Eve party, it's not so hot for keeping Army aircraft in the tip-top shape they need to be. Like homemade preflight checklists, homemade maintenance procedures which don't stress the need for checks aren't exactly in the same class as Mom's homemade apple pie.

Sticking to the book like a fly in a pot of honey is the only answer. Not just one of the answers. The only answer. That and the absolutely necessary check and supervision to see that, despite every precaution, a mistake still hasn't somehow got into the works.

And foul up the works it will to a fare-thee-well unless all service personnel and their supervisors have a grasp of the full scope of their work and their special problems. Proper fuel, to mention one pesky instance. People who wouldn't ask their automobiles to run on kerosene, or molasses, have been known to mix JP-4 with AVGAS, which gives U-8s high fevers and the dry heaves. When this happens it is as plain as the carvings on Mount Rushmore that neither the service people nor the pilots involved had made a check to see that they had the proper color-coded fuel for their aircraft, a case of one of those easily overlooked but easily checkable items which can put an aircraft in the emergency ward just when it is most needed.

Proper fueling is the concern of everybody who has a hand in the process. There are some areas in the checking procedure which are the exclusive property of the mechanics and their supervisors. In looking over the general state of health of the aircraft in their care, the men who can honestly call themselves expert with a capital E keep a close lookout for such telltale signs of wear and tear or potential trouble as defective roller bearings, cracks, rust, corrosion, metal fatigue or part failures. Above all, part failures. Nearly one-half of all the crashes logged in one particular week were logged as caused by part failures, a sure sign that some people somewhere weren't checking things out the way the book prescribes.

Finally, we come to our old arch-enemy, that dastardly arch-villain, FOD. To be fair about it, foreign object damage can be caused by such diverse



items as great horned owls, ham sandwiches and ball peen hammers, and it can't all be blamed on mechanics. Everybody has a responsibility and the best weapon is relentless check procedures with FOD in mind. Maybe FOD, like the poor, will always be with us but like the war on poverty, the war on FOD can keep it under control. The mechanics and their supervisors are the front line troops on a seek and destroy mission.

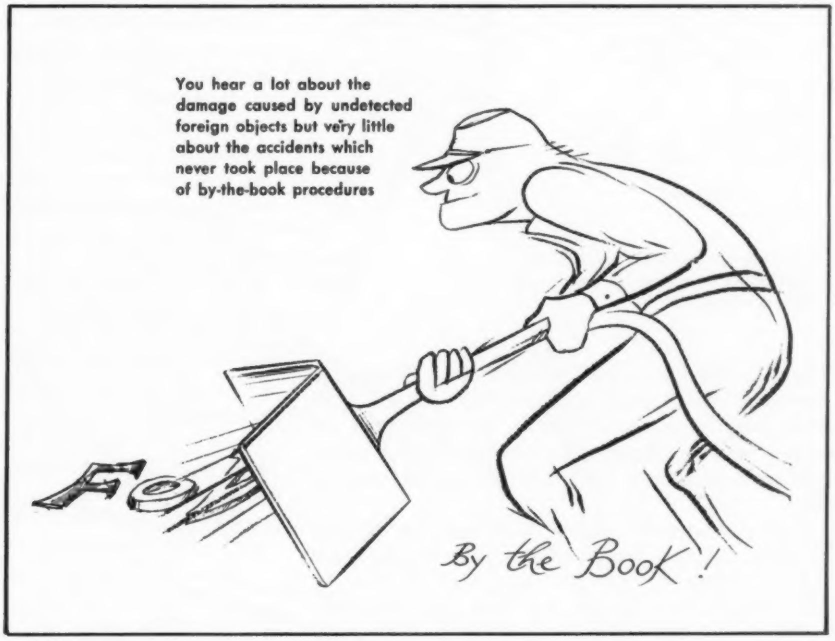
It works. You hear about the damage undetected foreign objects can inflict. Like the accidents which never took place because of by-the-book checks, you don't often hear of foreign objects which were apprehended before they could cause trouble. One example: A sharp-eyed inspector who believed in doing his job up brown found a sheet metal bucking bar hiding in the tail rotor drive shaft tunnel of a UH-1 tail boom. Your guess as to what would have happened if the bar hadn't been discovered is as good as anybody else's and is probably about the same.

COMMAND PERFORMANCE

Army mechanics, service personnel and pilots, capable and skilled as they all are, aren't supermen. No matter how conscientious he may be regarding his particular job, every human being from time to time needs guidance, counsel, supervision and direction.

All this is an essential part of the sound, preplanned and well-oiled managment program which is an essential part of every unit's operational philosophy. When you start hunting for a good place to start, you'd do well to consider that no management program will get far off the ground unless it puts proper and uniform checklist procedures where they belong—near the top.

In fact, it is required. AR 95-4 stipulates, in no uncertain terms, that unit commanders ensure that aircrew checklists be followed in all cases to ward


You hear a lot about the damage caused by undetected foreign objects but very little about the accidents which never took place because of by-the-book procedures

Men who can honestly call themselves experts keep a close lookout for telltale signs of wear and tear and potential trouble off inadequate starting, runup, takeoff and landing. The AR is just what it says, a regulation, and Army regulations aren't exactly in the same class as the kind but gentle advice you get from Dear Abby and which you are free to take or leave alone. Try wearing your uniform backward if you are one of those people who take some convincing.

Complementing AR 95-4 is the dash 10 CL which provides standard guides to make sure checks are made according to the book, whether the unit is located at Rucker, Sascatchewan, Da Nang or Due West, SC. The message is loud and clear. Every unit commander has a stated responsibility to see that all hands follow the checklist from top to bottom all the way without skipping any of the wayside stops. And the only way to do it is to do it with book in hand.

A conscientious safety officer regards an accident caused by an improper check as a personal affront . . .

It is a matter of positive thinking. No mature, normally confident person who knows his job likes to have it dinned into him night and day that he must perform in a certain way and only that way. But we are all human, remember? And accidents do keep on happening in which there is a checklist factor.

So it looks as if some gentle dinning in might not be such a bad idea. The principal dinner-inner in an accident prevention-conscious outfit is the full-time safety officer who spreads the word with all the fiery zeal of an old time backwoods preacher on the sawdust trail. It's the safety officer's job, as the unit commander's good right arm, to carry out the basic steps each commanding officer is told in DA Pamphlet 385-1 to set about organizing his continuing safety program. He sees to it that everybody knows about and follows safe practices. He institutes corrective measures when some unfortunates lose their way like the little lost sheep in the song. He is as nosy as a police dog when it comes to sniffing out unsafe acts and conditions.

In industry they call this sort of around-the-shift diligence "quality control." The manufacturers of Old Mother Hubbard's Dog Bones are well aware that they are tops in the dog food world because Fido prefers their product three to one over all other leading brands, as shown by a Gallop Poll. Old Mother Hubbard, Inc., started out with the high standards that took them to the top, but everybody at the dog bone factory knows that standards have a way of drooping like a candle in a heat wave unless somebody is on hand night and day to see they are maintained.

That's the way the safety officer feels about the preflight. When it comes to the need for maintaining the prescribed checklist standards he can talk your ears off—and will at the drop of a helmet. You don't even have to drop the helmet.

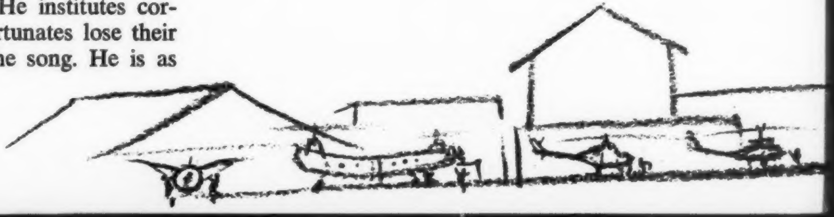
ALL IN THE FAMILY

A conscientious safety officer regards an accident caused by an improper check as a personal affront, the way the backwoods preacher used to take the news that the deacon had fallen off the wagon again. Despite all his missionary work, it is clear evidence that somebody has not got the word, or, what is worse, has failed to pay attention. It's enough to make a grown man cry.

Parson Jones knew that the deacon's latest losing bout with John Barleycorn came about because he couldn't resist influences which hit him at his weakest point. The deacon said it all started because it was a cold day and his feet hurt and he thought a little drop of something might warm him up. He warmed up, all right. In the pokey.

Every safety officer has heard much the same story more times than he wants to remember. He

The number one holler-guy in an accident prevention-conscious outfit is the full-time safety officer who spreads the word with all the fiery zeal of an old time backwoods preacher on the sawdust trail



knows that you can preach safety in general and the checklist in particular until the cows come home, but you can't make anybody really think if he wants to shut down his mind like an engine trying to run on JP-4 when its diet calls for AVGAS.

The checklist is a matter of individual responsibility shared by every member of the unit family, not just the commander or the safety officer. You know this. All the same—how often have you heard (or

said yourself when you were in a hurry to get back to the base): "The aircraft's okay. Let's give it a quick onceover."

Or have been handed a "revised" checklist with the famous last words: "Never mind what they told you at school. We do things differently out here."

Do you *always* insist on an oral call-out when you are following the checklist and if you don't get oral confirmation do you assume the worst? (In the case of the preflight, no news is bad news.)

When a fuel line has been taken off and put back in place, do you *always* check for leaks around the connections?

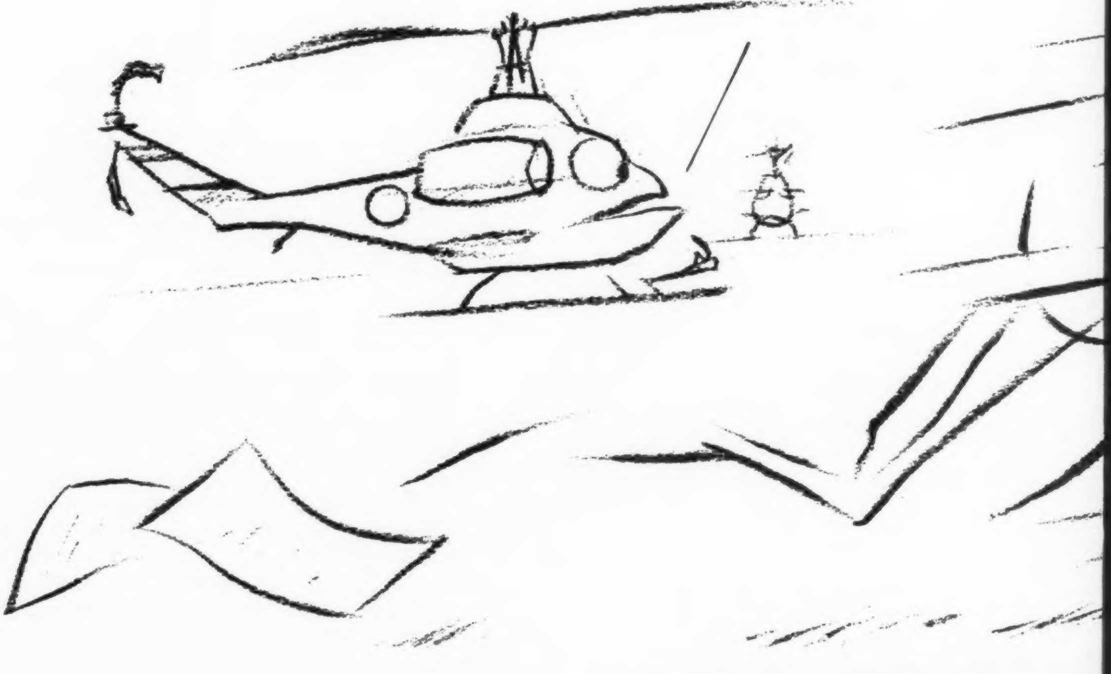
If you are interrupted during a check, do you take up where you left off, giving human nature a gap wide enough to drive a beer truck through, or do you start all over again?

Do you always make certain the book is in the aircraft?

Is guesswork among the Anglo-Saxon words you wouldn't want to use in front of a Sunday School class?

All this is a matter for the individual, particularly when the unit's aircraft are operating over a wide area out in the field. The safety officer and the unit commander share the common human inability to be in more than two or three places at the same instant. A large part of the time, aircrewmen and even mechanics are on their own to a considerable extent, and if they haven't taken the checklist as dead seriously as the safety officer had told them to a thousand times in as many ways, they have a better than average chance of winding up in the same messy bowl of soup as the deacon.

To tell the glad truth, the picture isn't all bad; in fact, indications are most pilots are doing a thorough preflight job. Early this year, the National Transportation Board reported to the FAA that the

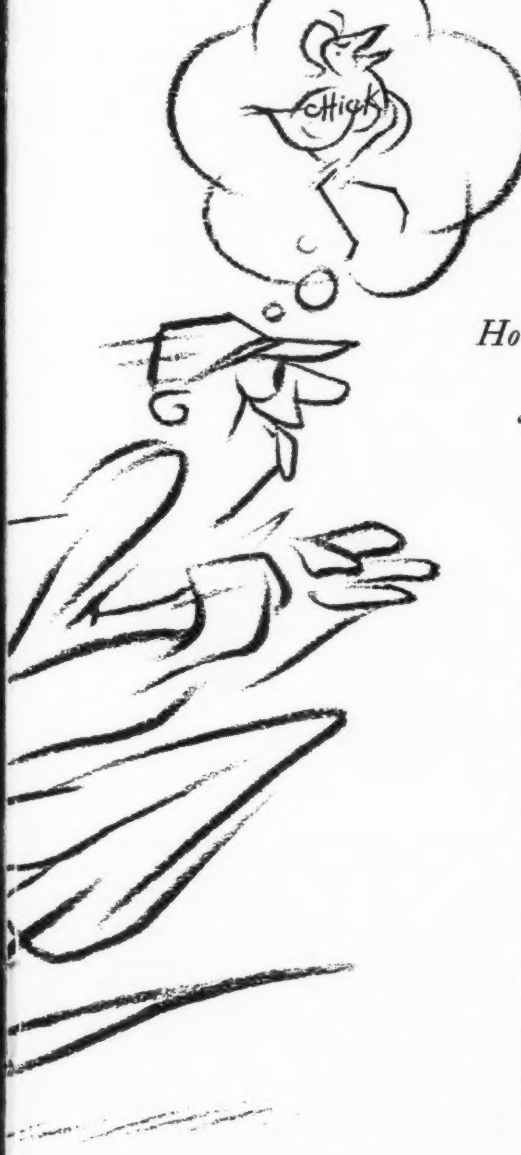


flight control locking devices on the Beech 55 (the Army's T-42A) needed modification to prevent operation of the aircraft when any component of the devices was engaged and that the fail-safe warning wasn't doing its job. The investigation came after three fatal civilian crashes, each caused when a highly qualified and experienced pilot overlooked removing gust plates before takeoff.

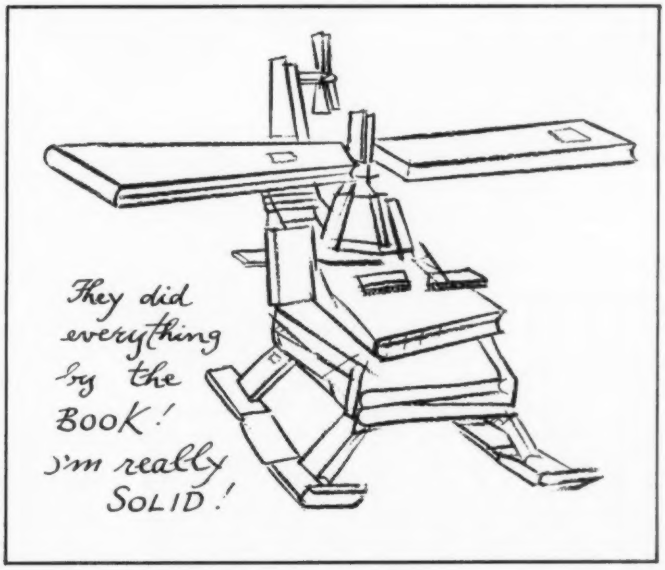
Through last October, Army pilots had logged over 307,000 hours in the T-42, involving an estimated 100,000 preflights. The Army has had its troubles with the locking devices, but not a single accident involving them has been reported, clear proof that most people are on the ball.

Most of the people, most of the time. But what your hard-working safety officer wants is *all* of the people *all* of the time.

Check, as Cautious Cal might say in agreement, and double check.



How often have you heard—or said yourself when you were in a hurry to get home—"The aircraft's okay. Let's give it a quick onceover"


They did everything by the BOOK! I'm really SOLID!

From April 1972 AIRSCOOP

the fine line

SOMETIMES there are fatal aircraft accidents that leave pilots shaking their heads and saying: "It shouldn't have happened. I just can't figure it out!" What follows is a tale of one of those accidents. . . .

An experienced pilot briefed his three wingmen on a routine navigation mission. After a smooth takeoff and join-up, the flight soon coasted out in the climb. Suddenly lead jettisoned his canopy and a moment later made a hard 180 to head for land about 3 miles away. His radio call was garbled, but other members of the flight agreed that he said he had a fire warning light as well as a DC generator-out light. The call was so confused that one wingman thought he heard mention of hydraulic failure.

The deputy flight lead called for the flight to go to guard channel. While the other flight members followed instructions, the leader flipped the selector the wrong way—to manual instead of guard. Because the function switch on the UHF was on main, there was no guard monitor capability. The pilot had thus cut himself off from the flight at the very moment when he needed help.

From this point on, things went from bad to worse. The pilot, thinking he was on guard channel, announced that he had *lost* his canopy. He said he had a fire warning light, that the engine was compressor stalling, and that he was heading for land. He added that he had a DC generator-out light and had switched to emergency fuel. There was no doubt that he knew he was riding a very sick bird.

But the pilot's transmissions were going out on an air traffic control frequency and were not heard by anyone in the flight. The ATC people answered his call with instructions for him to go to guard. For the next critical minute he repeated his frantic calls—each time ATC emphatically told him the same thing: "Go to guard channel!"

The compressor stalling stopped, but it was clear the engine had lost almost all power—the aircraft had sunk from 4,500 to 2,000 feet, and air speed had bled off from 320 to 250 knots. The high sink rate continued. At 600 feet with only 160 knots air speed, the pilot jettisoned the external tanks and lit the afterburner. Even max power had little effect, and the pilot again tried to call his wingman: "Look me over, buddy—quick!" For some time, the wingman had been pleading on guard channel for his leader to eject and had even gone back to the tactical radio frequency in hopes of regaining radio contact—all to no avail.

The aircraft was now over land, and a few more seconds passed before the pilot made his last transmission: "The egt is 900 degrees. I'm getting out!" But he didn't eject! He rode the aircraft in as it wallowed and sank the last 200 feet to the ground where it exploded.

There's a very fine line between hesitation and indecision, between a simple human error and a panic-induced mental blank. We can only speculate on why this experienced pilot crossed the line.

When he first saw a fire warning light and felt compressor stalls, he apparently jettisoned the canopy with the intention of immediate ejection. A hard turn to head back toward land isn't an unusual move for a pilot flying over cold water, but it does indicate second thoughts about quick ejection.

Flipping the UHF selector switch the wrong way is not too surprising when you consider that it's moved between manual and preset a thousand times for every time it's switched to guard. What is startling about this case is that the pilot never realized his mistake. After the third time the ATC people told him to go to guard, his reply was: "I *am* on guard!" He probably switched to main to cut out extraneous background chatter on guard. This bad habit is routine with many pilots, but such a seemingly insignificant move was a major contributing cause in this accident.

The aircraft was dropping out of the sky like a rock, and yet the pilot waited until 4,000 feet of altitude had been lost before getting rid of the nearly full external tanks. The aircraft was over water, so there was no reason to worry about what the tanks might hit. It appears that the pilot just wasn't thinking.

The final moments of the flight pose the most difficult questions. Why did the pilot wait until he was well below optimum ejection altitude before deciding to punch out? And then, once he had made the decision, why did he change his mind and ride the aircraft in? Many pilots have been lured to a low altitude ejection trying to fix a sick airplane, but this man went all the way down to 200 feet from 4,500 with no indications that power could be recovered. Was the problem, perhaps, an unreasonable fear of water? Finally, faced with the prospect of ejecting at 200 feet, did the pilot think his chances were better for surviving a crash landing or did the enormity of the problem simply overwhelm him?

Regardless of experience, a person can't really know how he's going to react to a particular emergency until that awful moment when he's faced with it. Reaction to an emergency is a combination of a person's training and knowledge along with his ability to function under stress. The flight surgeon on the investigation board of the accident wrote of the pilot's "mental saturation." His many mistakes and omissions attest to his confusion. In short, he was not in control of his thoughts and actions.

A man's capacity for decision making varies from day to day and even from hour to hour. Many outside influences, such as the situation he is in at the moment or situations he remembers from the past, can also affect his judgment. A more subtle influence can be a man's hidden fear of such things as water, fire, cold, or unusual flight attitudes. (Ed. note: I once knew a pilot who routinely ferried single-engine aircraft over the North Sea. Yet he had such an over-powering fear of water that during survival training, a direct order was required before he would jump from a 3-foot high dock into a quiet bay—even though he was wearing a life preserver and a survival suit. He had recognized his fear and was training to overcome it.)

THE FINE LINE

Fortunately, few aircrew members have actually experienced an ejection. Because of this, most have some mental reservations about it. Reluctance to leave the warm, familiar home of the cockpit and meet the cold unknown of the windblast is understandable and normal, but a moment of hesitation can be fatal.

From time to time, every crew member should do a little self-evaluating. How well do you know your airplane? Sure, you can pass a check ride, but are you confident that you can analyze and cope with any problem that may arise? How well do you know yourself? You may not be able to erase a fear, but by recognizing that fear you can train yourself to cope with it.

A positive approach to simulator training can pay dividends. Don't simply run through procedures. Have the instructor develop situations to truly tax your abilities.

Flying is a demanding business that is, by nature, hazardous at times. Knowledge of your aircraft and yourself can eliminate the mental blank—and save your life.

Note: Delay in initiating ejection, or as is referred to among Mohawk pilots, "the pause that refuses to recover the crew safely," has been the determining factor in nine of 15 fatalities involving Army personnel during a history of 92 ejections since 1962. These nine waited too long before ejecting, preventing safe recovery. Others, like the subject of this article, for some reason did not attempt to eject, and also became statistics. Remember, if you can't safely correct—EJECT!

EVER SINCE Leonardo da Vinci started fooling around with sketches of helicopters and advancing the theory of rotary wing flight, the one main deterrent to proving his theory was the lack of a suitable powerplant. Centuries after he died, the early fixed wing and rotary wing aircraft were still plagued by the same problem. However, with the advent of the thirties and forties, the reciprocating engine manufacturers began producing more reliable engines with more horsepower. Powerplant production next took a *giant* leap forward when the gas turbine proved feasible.

We have taken for granted that many of these turbines are rugged, reliable and will operate trouble-free for thousands of hours. However, like any engine, they cannot be abused and still be expected to put out 100 percent. In order to give some good rule-of-thumb tips the following Turbine 10 Commandments are listed:

The Turbine's 10 Commandments

George S. Gropp

Supervisor of Field Services
Aviation Power Supply, Inc.

1. Thou shalt not actuate thy starter without first verifying that thy twist grip is in full cutoff position, lest thou melteth thy first stage turbine wheel.
2. Thou shalt not roll thy twist grip to the lightoff position without ample oil pressure, lest thou condemn thy No. 8 bearing to eternal fire and overtemperature.
3. Thou shalt not steal thy engine's remaining life by deliberate overtemperature operation.
4. Thou shalt not covet more horsepower than thy engine is designed to give thee.
5. Thou shalt honor thy TOT, Torque and N_1 Limits.
6. Thou shalt hold no other factor in higher esteem than thy engine, lest when thou needest it most, it faileth thee.
7. Thou shalt remember that, though thy engine complaineth not, its suffering from abuse is great.
8. Thou shalt observe thy "dwell-time-at-idle" limits without fail.
9. Thou shalt maintain thy engine to the very best of thy ability lest thy negligence cost thy boss all his worldly goods.
10. Thou shalt do unto thy engine as thou wouldst have thy engine do unto thee.

Courtesy ROTOR & WING, August 1971

Sergeant First Class Howard W. Brewer
Office for Plans and Operations
USAAAVS

MR. AVIATOR

YOU ARE AN important man. You are important to your family, community and to the Army. Just as it is impossible for your family to assign a value on your importance to them, it is equally impossible for the Army to do so. But consider what it would entail for the Army to replace you. Applicants would first have to be screened for qualifications. The selected candidate would then have to undergo extensive and costly specialized training. Following this, he would have to serve for months, or years, at various assignments before he could attain the experience level and proficiency you now possess. Quite an investment in one man, isn't it?

To protect this investment, the Army continuously conducts research in all areas of aviation. Aircraft are made more crashworthy; engines, more reliable. Warning and escape systems are constantly being improved. So are communications and navigational equipment, as well as protective flight clothing and survival gear. Flight surgeons and other skilled medical specialists are provided to guide as well as care for you. Training programs in all fields are constantly monitored and updated. Some agencies function to compile data and pinpoint problem areas for correction. Others revise inspection requirements, maintenance procedures, checklists and ARs. Yes, Mr. Aviator, thousands of people in a variety of occupations work daily to directly or indirectly support you in safe mission accomplishment.

What is your reaction? Do you take advantage of the time, effort, knowledge and skill expended by others to keep you safe? Unfortunately, some pilots do not. Although these individuals would never dream of violating the calendar year by postponing Christmas until the following July, they think nothing of putting off a preflight inspection. They would never embark on a hunting trip without making certain they had an adequate supply of shells, but they are apt to lift off on a cross-country flight without ensuring that they have ample fuel. Results of these kinds of actions appear regularly in the pages of the Weekly Summary.

One aircraft crashed during takeoff. The cause? Failure to perform a thorough preflight or use the cockpit checklist resulted in takeoff being attempted with an external gust lock installed.

The pilot of another aircraft performed an abrupt flight maneuver during an unauthorized low level flight, causing the aircraft to stall and crash.

In the span of a few days, pilots of three aircraft had to make forced landings. In each case, the cause was fuel exhaustion.

Following an accident that resulted in a postcrash fire, two aircraft occupants were exposed to flames for approximately the same length of time. One sustained first- and second-degree burns over a relatively small area of his body. The other received extensive second- and third-degree burns. The first man survived; the second did not. The difference? The survivor was wearing a Nomex flight suit and leather boots. The other occupant, fatigues and jungle boots.

Obviously, a seatbelt is of no benefit if it is not fastened, and an AR is of no value if it is not adhered to. In short, the Army can provide you with the best equipment, training and guidance available; but it must depend on *you* as an individual to apply this knowledge, follow directives and properly use available equipment.

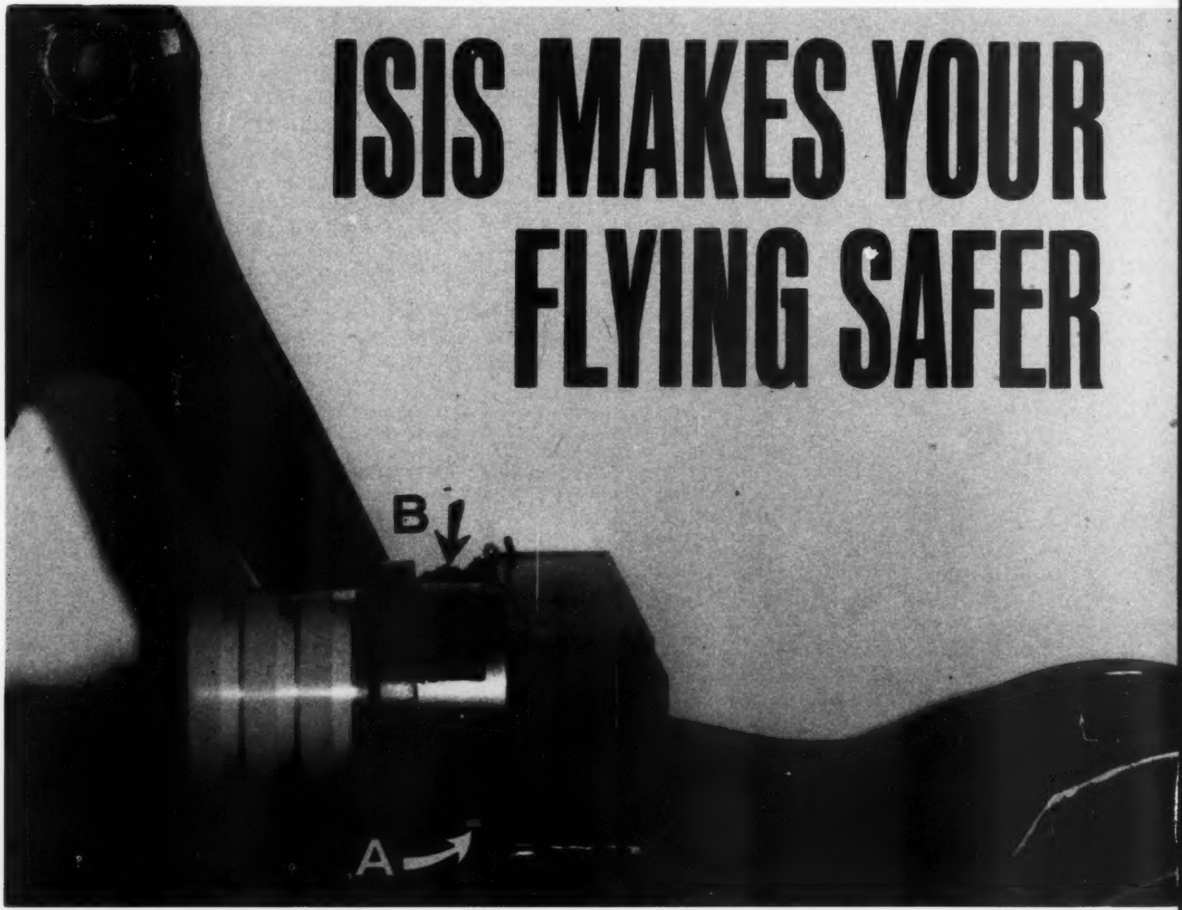
Yes, Mr. Aviator, you are important to many people and in many ways. But what matters most is not the value placed on you by others, but that which you place on yourself.

ISIS MAKES YOUR FLYING SAFER

THE ACRONYM ISIS is being tossed around cargo helicopter circles these days like rice at a wedding. Just what is ISIS? How does it work? What benefits does it provide? To begin with, ISIS, or integral spar inspection system, is the end product of a military development item designed primarily to detect cracks in CH-47 main rotor blade spars and sockets, and to provide a warning in time to prevent failures. The basic components of the system consist of an air valve and an indicator for each blade.

Blades to be modified are partially disassembled and thoroughly inspected. Those which successfully pass inspection are sealed at the outboard bulkhead, on the blade inboard seal (socket to spar), and at the incidence bolt hole, and an evacuation valve and ISIS indicator are installed on the root end. Air is then evacuated from the hollow spar to approximately 13 psi below normal atmospheric pressure. If a crack develops from any cause, sufficient vacuum will be lost to cause activation of the indicator.

When modified blades are installed on an aircraft, the ISIS indicators can be readily checked from the ground while the blades are in a static mode. An



Piston indicator incorporates push-to-test button (A) for functional check. Capped and safetied air evacuation valve (B) which should remain intact is partially hidden by indicator assembly

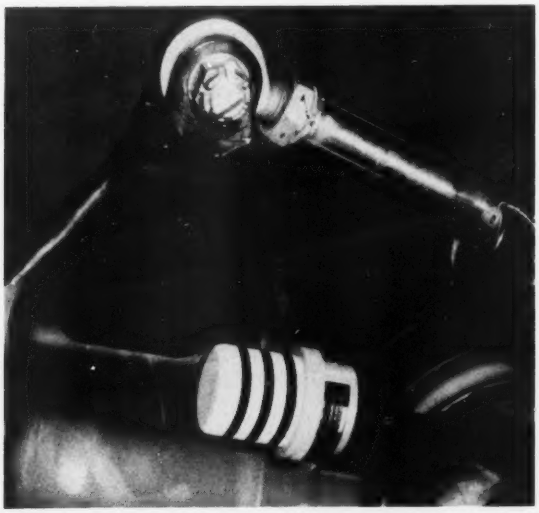
Major Edwin R. Widmer
Aircraft Accident Analysis and
Investigation Department
USAAAVS

all-white indication denotes a partial vacuum within the blade spar—and an absence of cracks. Alternating black and white stripes indicate loss of vacuum and the possibility that one or more cracks may exist. Affected blades should be removed and returned to depot.

For a functional check, a press-to-test button is incorporated on the indicator. When the button is depressed, the cylinder within the indicator housing moves to show alternating black and white stripes (unsafe) and when released, the indicator pops back to all white (safe). The indicator is designed to be functionally checked only *once* daily, as each time the button is depressed, a slight amount of vacuum is lost. The press-to-test button can be depressed approximately 400 times before enough vacuum is lost for the indicator to show unsafe. Overactivation of the button (more than once daily) will lead to unnecessary maintenance and possibly premature removal of blades. Development of an improved press-to-test unit which will retain all vacuum in the spar when the button is depressed is under consideration. However, details as to when this unit will be produced and incorporated are unavailable at this time.

CH-47A blades are scheduled for immediate modification. Blades installed on B and C models will be modified at a later date. Modifications are to be accomplished at depot level under ECP (engineering change proposal) action.

Aside from the obvious safety factor, ISIS provides other advantages. It offers improved corrosion protection for the spar, since it is sealed from the atmosphere, and permits the currently imposed weight and air speed restrictions on CH-47A helicopters to be lifted. Effect on weight and balance is negligible. Empty weight of the aircraft increases approximately 10 pounds with no change in center of gravity. In addition, blade borescope inspection requirements are eliminated on modified blades, and no scheduled maintenance is required on the integral spar inspection system. Unscheduled maintenance and false crack indications have been determined to occur infrequently, and high system reliability can be expected. In the future, we can look for all CH-47s to be ISIS equipped, enhancing reliability and safety—your safety!



Alternating white and black stripes on indicator denote the possibility of cracks on blade spar or socket. Affected blade should be returned to depot.

Functional check of each indicator should be limited to once daily. Note alternating white and black stripes when push-to-test button is depressed. ISIS indicators can readily be inspected from the ground

PEARL'S

Personal Equipment & Rescue/Survival Lowdown

SPH-4 HELMET AND VISOR

ONE OF THE more recent personnel equipment improvements to evolve from the Army's continuous research effort is the SPH-4 helmet. Compared to the APH-5 and AFH-1 helmets, the SPH-4 is more comfortable and provides improved sound attenuation, increased head protection and greater retention capabilities *when properly fitted and restrained*. These benefits are the result of major modifications to the suspension system, shell construction and design of the ear cups. Recent tests show that the SPH-4 provides the best hearing protection of all helmets currently in the U. S. Armed Forces inventory. In addition, the M-33 microphone used on the APH-1 and APH-5 helmets has been replaced by the improved M-87.

The SPH-4 was classified standard A in December 1969, but was issued on an established priority basis because the procurement rate was not sufficient to allow simultaneous issue to all pilots and crew members. However, helmets are now available to satisfy the Army's requirements and funded requisitions for helmets and spare parts should be submitted to the United States Support Center, Philadelphia, PA. Subsequent to initial issue, *all* authorized flying personnel reassigned in continued flying status *will* retain possession of and *carry* their SPH-4 helmets to their next duty station. The APH-5 and AFH-1 helmets have been declared obsolete and will be reported as excess in accordance with AR 755-1.

At the time of initial procurement of the SPH-4, production equipment and manufacturing techniques produced polycarbonate visors which did not meet military specifications for distortion of vision. As a result, the first 20,000 SPH-4 helmets (Lot Nos. 1-25) were equipped with acrylic visors. Subsequently, equipment and manufacturing techniques were improved to reduce optical distortion in the polycarbonate visor to an acceptable level. All SPH-4s delivered to the Army beginning with Lot No. 26 were equipped with polycarbonate visors, which are significantly more fire- and shatter-resistant. For maximum protection, the polycarbonate visor is recommended.

To determine which visor is installed in an SPH-4 helmet, remove the visor from the housing as prescribed in TM 10-8415-202-13 and check the number stenciled on the side of the visor. If the visor is clear and has number 69C2110 stenciled on it or if the visor is neutral (tinted) and has number 69C2109 stenciled on it, the visor is polycarbonate. If the visor is clear and has number 66C1611 stenciled on it or is neutral (tinted) and has number 65C1489 stenciled on it, the visor is acrylic. Replacement polycarbonate visors may be requisitioned as follows:

Visor Lens Assy, Neutral Polycarbonate—FSN 8415-490-1196

Visor Lens Assy, Clear Polycarbonate—FSN 8415-490-1197

Current supply of polycarbonate visors should be sufficient to prevent delay of requisitions.

Have your helmet checked by a responsible authority and replace the acrylic visor as soon as possible. If you cannot locate a responsible authority, check it yourself. The most positive way to determine which visor you have is by checking the stenciled numbers as described above, but if no number can be found on the visor, then look for a lot number located inside the helmet. If the lot number is 26 or higher, the visor should be all right. You may find the size but no lot number stenciled. If no lot number is found, visually inspect the visor shield. If your helmet has an old visor shield and the lot number cannot be identified, it may have the acrylic visor installed.

As a closing thought, Pearl reminds you that the effectiveness of any equipment depends on its proper use. So be sure your HELMET IS PROPERLY FITTED, THE CHIN AND NAPE STRAPS ARE SNUGLY FASTENED AND THAT YOU DO *NOT* USE A CHIN PAD.

[illegible] have a questi[illegible]
[illegible] personal equipment
[illegible]cue/survival,
[illegible] USAAAVS
[illegible] AL 36360

TO MOVE A MOUNTAIN

DEEP IN THE highlands of the Republic of Vietnam, engineers built a small airfield. Off one end of the runway there was a small mountain. During the monsoon season when the fog was thick and the clouds were low, this mountain would suddenly appear directly in the path of aircraft taking off or landing. It had caused numerous mishaps and posed a constant threat to the safety of those operating from the adjacent airfield.

One day, an aviation safety officer was assigned to this unit. He took one look at the mountain and said, "To make my airfield safe, this mountain must go." Of course, he couldn't move the mountain; so he notified the battalion aviation safety officer of the hazard.

The battalion ASO came down, took one look at the mountain, and said, "To make this airfield safe, this mountain must go." But, of course, he couldn't move the mountain either. So he called the group ASO and told him about the problem.

The group ASO came down, looked at the mountain and said, "To make this airfield safe, this mountain must go." But neither could he move the mountain; so he sent a message to the brigade ASO, notifying him about the hazard.

The brigade ASO came down, looked at the mountain and agreed that to make the airfield safe, the mountain must go. But he couldn't move the mountain either; so he sent a letter to the USARV ASO with a diagram of the airfield and the small mountain.

The USARV ASO, in turn, sent the USARV engineers to survey the mountain, and even though this was a small mountain, they couldn't move it either. So they put a light marker on top of it. Then the USARV ASO had a diagram of the small airfield placed in the tactical airdrome directory for Vietnam, which depicted the small mountain on one end of the runway, with the light marker on top.

All unit pilots were then assembled and explained the hazards of the mountain. The battalion pilots were similarly assembled and briefed, and the obstruction was included in the battalion hazard-to-aircraft file. Also, as SOP, all new pilots assigned were given thorough briefings. Finally, a message was dispatched to all group as well as brigade pilots, informing them of the mountain hazard. Although the mountain couldn't be moved, it was marked and steps taken to ensure that every aviator knew of its presence.

As an ASO you may not be able to move mountains, but you can take action to transform them into proverbial "mole hills"—and ensure safety.

Major Christopher L. Fuller

Office for Plans and Operations
USAAAVS

AVIATION ACCIDENT PREVENTION FORUM

an interchange of ideas between readers and USAAAVS on subjects of aviation accident prevention

NOTAMS

There has been some discussion among our readers about the article, "280 Feet Too Low," which appeared in the July issue of the AVIATION DIGEST. *Several have inferred a criticism of USAASO in the following recommendation of the accident board published in the article: "That approach plates published in the Flight Information Publication be current, accurate, and not contain information which may tend to degrade the accuracy of an instrument approach." Approach plates are sometimes published prior to a facility being operational. USAASO does not publish approach plates. However, they do publish NOTAMS to point out that a published approach plate may not be totally correct. The article did not state that a NOTAM had been published several weeks before the accident to correct the procedure described in the approach plate. Keeping up with NOTAMS is the pilot's responsibility, and he should validate any approach plate by checking it against the NOTAMS.*

Hearing Loss

I'm not sure how this should be worded but consider it a suggestion by an extremely disenchanted ex-aviator.

I recently read your article in the February AVIATION DIGEST about ear protection and it struck close to home. However, don't just condemn aviators. Some of the blame is the Army's for not demanding better soundproofing or noise reduction on their aircraft. Upon return from RVN, I was medically grounded for my hearing. I knew this was coming as I couldn't listen to a telephone in one ear. I flew CH-47Bs in RVN and the commander's policy was to have the soundproofing removed so CEs could see all the integral lines, pumps and parts. I wore an SPH-4 helmet and earplugs but still lost my hearing. True, my ears must have been more susceptible because I only logged 300 hours, but most CH-47 pilots I know have definite hearing losses.

The Army's tests were run on an empty CH-47A with soundproofing installed. In a combat zone, the aircraft is flown fully loaded most of the time without soundproofing. The Army needs to test these aircraft as they are going to be flown in combat. The difference is very noticeable. The Army's test confirms that even with soundproofing the noise level of the CH-47 is far above the safety margin. With the CH-47 fully loaded and without soundproofing, an SPH-4 simply cannot bring the level down enough.

There is no field for grounded warrants without enlisted service, so now I am forced to leave the Army. If someone doesn't wake up, many fine officers will be lost in the same way. Let's see if this can be prevented by a little closer look at the requirements we set on aircraft designers. It is too late for myself but not for the many to follow me. As you well know, the only career field open for grounded aviators is 671B, and at present, that is closed. The only alternative is civilian life.—CW2, Aviator

Thank you for being interested enough in someone else's welfare to write such a thoughtful letter. USAAAVS is aware of the problems involving noise levels in Army aircraft, and we are continuously attempting to keep appropriate agencies informed of these problems. Accordingly, copies of your letter have been forwarded to the CH-47 Project Officer at U. S. Army Aviation Systems Command and the U. S. Army Aeromedical Research Lab.

Nomex Care

As troop safety officer, I have advised all aviators of the proper procedures for cleaning and caring of the Nomex uniform. This concerned the temperatures for washing and drying, and the effects of tailoring and starching.

As a result of this, a question

came to me regarding steam pressing of the Nomex uniform. I have advised against it, due to the excessive temperatures involved. However, I do not have any published material that would give reason not to steam press the uniform.

I would like to request information from USAAAVS concerning the possible damage and temperature factors related to cleaning and steam pressing of the Nomex. Any assistance you could give me in this matter would be greatly appreciated.—CW2, ASO

According to U.S. Army Natick Laboratories (the developer of the Nomex uniform), no adverse effect will result from steam pressing the Nomex uniform. Both the May and August 1971 AVIATION DIGEST *contained useful articles on the laundry and maintenance of these uniforms.*

Nylon Panel

I do not understand the rationale for approving a nylon panel to be carried in the Nomex flight suit. The relatively low melting point of nylon and its ability to transfer heat appear to be inconsistent with the purpose of the Nomex flight clothing. Would not a cotton satin material be more appropriate than nylon?—CPT, ASO

We took your question to U. S. Army Natick Laboratories personnel. They tell us that the 1.1 nylon rip stock material is the only fabric that will accept the reflective international orange color with any durability. In addition, the probability of a heat transfer hazard is very doubtful because the survival panel is enclosed in layers of Nomex, there is a Nomex layer between the panel and the skin, and the panel is folded compactly.

Fire Retardant Process

Recently, several helicopters have been shot down, crashed and burned in this command. In almost all cases in which noncrew members were on board, they suffered more severe burns than the crew members involved. The reason for this, obviously, is that the crew members were all wearing protective Nomex clothing whereas the noncrew members were not.

I am concerned about those personnel who do not fly on a daily basis and yet, if in the wrong aircraft at the wrong time, need more protection than jungle fatigues provide. I recall there were some special as well as homemade preparations that we had several years ago in which we would soak jungle fatigues to provide a fire-resistant capability for X number of days. Request that you provide a listing of any preparations with instructions that would be used in this regard.

With many thanks.—Commander.

Cotton fatigue uniforms may be made fire retardant as follows:

1. Clean fatigues by washing with detergent. Dry thoroughly.

2. After they are thoroughly dried, submerge and agitate fatigues 10 minutes at 100 degrees F. in the solution described below:

6 gallons of water
2 pounds of borax (FSN GA 6810-264-9056)
1½ pounds of boric acid (FSN GM 6750-174-5454)
1½ pounds of ammonium phosphate, dibasic (FSN 6810-264-6547)

3. Hang to dry. CAUTION: Do not dry in automatic dryer or wring dry. DO NOT IRON.

Fire retardant qualities gained through this process are lost after fatigues are washed or exposed to soaking rainstorms. The process must be repeated for protection.

Readers are invited to participate in this forum.
Send ideas, comments and recommendations to
Commanding Officer,
USAAAVS,
ATTN: E&P Department,
Ft. Rucker, AL 36360

Statistics

I am attending C&GS and need some aviation safety statistics to use in a staff study. Is this type of information available to students?—MAJ, Aviator

Students and others interested in aviation safety may obtain, upon written request, aviation safety statistics from USAAAVS. We must point out, however, that the data available are those required for us to conduct our mission, and if this information is not what you need, money and workload make it impossible for us to create computer programs to meet individual requests. We hope what we have available will meet your requirements.

Flight Records

I will soon be getting out of the Army. Will my flight records be on file at USAAAVS after I am discharged?—E5, Crewchief

Negative. Make sure you have all the information you may need about your flight hours, orders, etc., before you are discharged or retired. USAAAVS does not receive completed DA Forms 759 and 759-1 for nonaviator crew members. Your flight records remain in your unit and, according to AR 95-64, only the latest DA Form 759 will be forwarded with your 201 file when you leave the unit.

Broken Wing Awards

FORT HOOD, TEXAS—CPT Elias B. Baker (center) was presented the Broken Wing Award by MAJ George R. Nelson (right), acting commander, 227th Aviation Battalion, 1st Cavalry Division, Fort Hood, as CPT Robert N. Lichtenberger, Battery commander, looks on. CPT Baker was on an AH-1G rocket run demonstration in Vietnam when he experienced hang fires in the number seven tubes of both XM-158 pods. When the rockets broke loose, 8 inches of the tubes blew out, resulting in a series of events, which caused loss of the tail rotor and 90-degree gearbox and extensive damage to the IRS shield, right engine cowling and pylon cowling. Having difficulty maintaining directional control, he flew to a nearby airfield and gradually descended. On landing, the helicopter turned 90 degrees right and CPT Baker applied full right aft cyclic to prevent the aircraft from overturning. The AH-1G slid 30 feet and turned 150 degrees to the right before coming to rest upright, with no damage.

MOBILE, ALABAMA—Army Aviation's Broken Wing Aviation Safety Award was presented to CPT Richard J. Williams (right) by COL Clarence C. Newsom, commanding officer, 226th Field Depot, Alabama Army National Guard. CPT Williams was on an OH-23C night training mission when his engine failed during climbout at 500 feet over a heavily populated area, river and dense vegetation. He autorotated to a 200- by 150-foot clearing behind a nursing home, surrounded by dense 60-foot trees with a flagpole located two-thirds of the way upwind. He then made a 270-degree turn to reach the longer axis of the landing area and landed without damage. CPT Williams, a former member of the 226th Field Depot, is now assigned as commanding officer, Company B, 230th Engineer Battalion, Fort Whiting Armory, Mobile, AL.

Army Aviation
Broken Wing Award

FORT RUCKER, ALABAMA—WO1 Clifford W. Lemen (left) received the Broken Wing Aviation Safety Award from LTC James T. Bridges, commander of the 6th Student Aviation Battalion at Rucker. WO1 Lemen was cited for extraordinary skill, judgment and technique when he experienced TH-55A engine failure and autorotated to a rough and narrow confined area, surrounded by obstructions. At the time of the emergency, WO1 Lemen was a student pilot at Fort Wolters, TX, with only 68 hours of flying experience.

USAASO Sez

The U. S. Army Aeronautical Services Office discusses

Cleared As Filed-(?): Pilot I. M. Happy has just received his preflight briefing, dutifully filed his flight plan and requested *6,000* feet altitude, submitted his departure time and is hanging loose, raring to go. At last he hears the good old efficient air traffic controller announce, "Army 6-8-1-4-1, *cleared as filed,* maintain *4,000,* report passing Cherry Intersection," and good old Happy is on his way sailing blissfully through the blue cloud-studded skies. He makes a few routine last minute cockpit corrections, checks his charts, lights a cigarette, leans back and relaxes and begins watching the scenery below slowly passing by as he tools along at *6,000* feet. Alas, poor Happy forgot, or did not fully understand, the abbreviated IFR departure clearance procedures relating to specified altitudes.

The air traffic controller will sometimes issue an abbreviated IFR departure clearance, based on the route of flight filed by the pilot in the IFR flight plan, provided the filed route can be approved with little or no revision. However, a controller will not issue an abbreviated clearance if he has knowledge that the original filed route of flight has been subsequently changed or will not be accepted by the pilot. In this case the pilot will request a detailed clearance be issued by ATC. A pilot in his initial radio communication with the facility concerned will state: aircraft identification, location, type of operation planned (IFR) and point of first intended landing (destination airport).

The abbreviated clearance as issued will be considered as a clearance to the destination airport filed in the flight plan. The destination airport will not be stated in the clearance. A specific SID, including a transition route, if appropriate, filed by the pilot, will be considered part of the route of flight. ATC may specify an SID if not previously filed. It may be necessary for ATC to clear an aircraft via an SID which differs from that filed or the filed route with a minor change.

Enroute altitudes filed in an IFR flight plan are not part of the abbreviated flight plan program. In all cases *the assigned enroute altitude/flight level will be stated in the clearance;* it may or may not be the same as the altitude/flight level filed.

Clearances are normally issued for the altitude/flight level and route filed by the pilot. However, due to traffic conditions it is frequently necessary for ATC to specify an altitude/flight level or route different from that requested by the pilot. You should pay particular attention to the clearance and *not assume* that the route and altitude/flight level are the same as requested in your flight plan.

It is suggested that pilots make a written record of clearances at the time they are received and verify, by a repeat back, any portions that are complex or about which a doubt exists. It is the responsibility of each pilot to accept or refuse the clearance issued. Further, to ensure the success of the abbreviated clearance program pilots should: (1) Include specific SID/transitions and preferred routes in flight plans whenever such routes meet pilots' needs. (2) If feasible, avoid making changes to a filed flight plan just prior to departure. (3) Request route/altitude verification or clarification from ATC if any portion of clearance is not clearly understood. Also, remember, ATC will issue a detailed clearance when requested by the pilot. Above all, when planning your flight consult your DOD FLIPs and check your sectional or other VFR charts too. Don't get yourself involved in an OHR; play it safe!

Our thanks to the authors, LTC Dick Luy and CPT Ken Wells of the U. S. Air Force, and to the 4500th Air Base Wing Flying Safety Newsletter, Langley AFB, VA, for permission to reprint this article. It was brought to the DIGEST's attention by 1LT Jon Kahler of the USAF's Detachment 9, 16th Weather Squadron at Ft. Rucker, AL. The authors are assigned to the Base Weather Service at Langley AFB.

Weather Tidbits

HOW MANY times have you made the comment, "Hey man, that weather out there is a lot lower than weather reported. I didn't see the runway until I was way below their 300 foot ceiling!"

Well, we hear it a lot this time of the year at the weather station. Actually, what you said was *true*. The altitude at which you saw the runway did vary from the reported field conditions. This phenomenon occurs during obscurations to visibility and is called "pilot's effective ceiling (PEC)." In most cases this ceiling (vertical visibility) is lower than the reported field conditions. Why? Because PEC is basically determined by slant range visibility and there is no way to determine how this visibility will appear to you, the pilot of a moving aircraft, as you approach the runway.

We can and do report horizontal visibility and vertical visibility. In fact, these are the items given to you in surface weather reports. The horizontal visibility reported is the horizontal prevailing visibility along the ground. Also, during certain bad weather conditions, quadrant and runway visibilities will be reported in the remarks section of the observation. Vertical visibility is the vertical distance to the reported cloud bases or the vertical visibility into an obscuring phenomena such as fog. Since obscuring phenomena cause the lowest visibilities and ceilings, let's talk about them.

When the sky or clouds are partially or totally hidden from a ground observer by fog, rain, snow or haze, etc., we say the sky is obscured—brilliant! When the sky or clouds are totally obscured, the ceiling reported is the vertical visibility from the ground into the cloud. For example, if all the sky is hidden by fog and the vertical visibility is 500 feet, an obscuration ceiling of 500 feet is reported. This obscuration ceiling of 500 feet is a real heavy compared to a nice, sharp cloud ceiling of 500 feet. In the latter case, a pilot will see the ground and the runway on the glide path when the aircraft penetrates the cloud base at 500 feet above the ground. However, in the case of the obscuration ceiling, the obscuring phenomenon (the junk you're in) extends downward to the ground and the pilot will not be able to see the runway or approach lights during an approach until well after descending through the level of the reported ceiling. Of course, the pilot will be able to see the ground directly beneath his aircraft when he passes through the obscuration ceiling, but he will not make visual contact with the runway until descending considerably lower than the reported ceiling (see accompanying figure).

Since the pilot probably has less interest in seeing the tree tops below him than he has in seeing the runway in front of him; he is 99 percent interested in effective ceiling (old PEC again). Solution: "Weatherman, tell me the PEC."

"Sorry, can't be done. In fact, much to our sorrow the best we can do is provide you measured visibility out and up *and advise you to expect lower than reported ceilings during obscurations;* you'll see a bunch of them this winter."

"SUPER SIMULATOR"

SEE PAGE 6